

FLORA OF THE USSR

published under the supervision and chief editorship
of Academician V. L. Komarov

VOLUME XXX

COMPOSITAE

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Genus *Hieracium*

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Genus *Hieracium*

Volume Editors

B.K. SCHISCHKIN and E.G. BOBROV

General Scientific Editors

Stanwyn G. Shetler

Galina N. Fet

Ellen A. Unumb

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STANWYN O. SMYLER
College of Biology
University of Maryland
Earthquake Institute
Washington, DC 20360

Assisted by Gail M. For
Harrison, West Virginia 25701

Ellen A. Gumb
Baltimore, Maryland

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A.J. Juxip

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SCIENTIFIC EDITORS' PREFACE TO VOLUME XXX

This thirtieth and final volume completes for the Smithsonian Institution the translation into English of the encyclopedic *Flora of the USSR*. It also represents the last volume of the six (Vols. XXV–XXX) devoted to the large family Compositae (Asteraceae). We have reviewed every page of the translation of this volume, including all descriptions. Although finding the right words for the translation of technical terminology is always a challenge, we are confident of the general accuracy of the translation of this and preceding volumes, recognizing, of course, that there will be imperfections. As in the other volumes on this family, the translators have used the Latin term "capitulum" (pl., capitula), instead of the more familiar English term "head," for the Russian term denoting the primary inflorescence of florets.

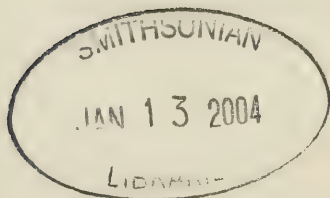
The first volume of the translation was published in 1968. Through the many years that this project has been in progress, many persons have been involved in the translation, review, and publication of these volumes. On behalf of the Smithsonian Institution, we wish to thank sincerely all those who have been a part of this long effort. We also wish to acknowledge most gratefully the support of the National Science Foundation of the United States, which made the translation possible in the first place.

August 2001

STANWYN G. SHETLER
Curator of Botany Emeritus
National Museum of Natural History
Smithsonian Institution
Washington, DC 20560

Assisted by Galina N. Fet
Huntington, West Virginia 25701

Ellen A. Unumb
Bethesda, Maryland



PREFACE

The thirtieth volume of the *Flora of the USSR* contains the descriptions of the species of the genus *Hieracium*, the last genus of the system.

The extreme difficulty of the systematics of this genus is associated with the apomictic reproduction of the vast majority of the species. The absence of any significant recent revisions in the Russian literature has made the study of the hawkweeds of our flora practically impossible.

A.J. Juxip, who for many years studied the hawkweeds of the northwestern European part of the USSR, took upon himself the enormous task of reviewing all the accumulated materials and preparing a revision of the species of *Hieracium* for the entire territory of the Soviet Union. The outcome of his work is the thirtieth volume of the *Flora of the USSR*, containing descriptions of 785 species of hawkweeds, of which about 140 species are described as new.

A.J. Juxip's work is the first comprehensive revision of hawkweeds of the USSR. Its publication opens up the possibility of a serious study of the hawkweeds of the native flora, which is especially needed first of all for regional floras.

The author of the present treatment, in keeping with the tradition existing among researchers of the genus *Hieracium* elevates the taxonomic units, initially established as subspecies, to the rank of species. This, to a certain extent, contravenes the existing rules of nomenclature, although in the present case it is in practice very convenient. Mention must also be made of some ambiguity that exists at present in both the identification of the first supraspecific category (cycle) in hawkweeds and in the nomenclature of it.

Editorial Board

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HIERACIUM* L.

L. Sp. pl. (1753) 799.

All florets in capitulum ligulate (but sometimes forms with tubular florets present: with styles exerted or included), usually numerous, less often few (*H. hololeion* Maxim., *H. transsylvanicum* Heuffel and others), yellow of various shades, less often red or orange (*H. aurantiacum* L.), still rarely whitish-yellow, 5-dentate at tip, with glabrous or somewhat ciliate teeth. Involucral bracts usually imbricate, less often lower bracts as if forming outer involucre (subgenus *Stenotheca*, all more or less appressed, less often outer bracts lax (*H. alpinum* L.) or with recurved cusp (*H. umbellatum* L.), on maturity becoming hard and recurved, freeing achenes. Receptacle flat, pitted, alveolar teeth glabrous or ciliate (*H. sabaudum* L.). Achenes cylindrical or prismatic, 10-ribbed, without beak, truncate (not constricted as in *Crepis*). Pappus 1- or 2-seriate, of stiff, fragile, yellowish or dirty-white hairs, very rarely pure white and not fragile, similar to those in *Crepis* (in our country in *H. triste* Willd. from subgenus *Stenotheca* and in *H. hololeion* Maxim. from subgenus *Euhieracium*).

Perennials of extremely diverse habit with pubescence of diverse form and degree. Hairs of three types: 1) simple, barbed or (very rarely) plumose (latter type in section *Plumosa*); 2) glandular hairs or stalkless (often micro-)glands and 3) stellate hairs (flakes), forming felt when dense. Stems leafless scapes to densely leafy (species with sparsely leafy stem generally have well developed basal rosette). Inflorescence single-headed to dichotomously, paniculately, corymbosely or pseudoumbellately branched (cymose).

Plants growing in temperate or cold regions mainly in the Northern Hemisphere, on the plains and particularly in the mountains, many species reaching the alpine zone (in the warmer regions exclusively in the mountains). Out of a total of four subgenera, two, *Mandonia* and *Stenotheca*, are found in America (*Mandonia* is endemic to the Andes, and *Stenotheca* has several representatives also in Eurasia), whereas the other two subgenera, *Euhieracium* and *Pilosella*, are mainly Eurasian, with most of their species concentrated in Europe.

Note. In view of the fact that almost all species of this genus are capable of developing mature achenes without fertilization (apogamously), the genus *Hieracium* is one of the most polymorphic genera of the Plant Kingdom. Thanks to hybridization and apogamy an

*From the Greek word *hierax*, meaning hawk, falcon (whence the Russian name Sokolnik [hawkweed] in the works of earlier authors). This name first appeared in the work of Dioscorides.

unusual diversity of forms has developed. To be convinced how complicated the systematics of this genus is, it is enough to state that up to the present more than 15,000 forms of hawkweeds have been described. But despite the extraordinary capability to develop a large number of forms connected through a series of intermediates within the given subgenus, the subgenera themselves, however, do not exhibit similar transitions (excluding only *Stenotheca* and *Euhieracium*). As a result, they are so sharply different from each other that they could be considered as separate genera. Even despite the fact that over the long course of time the boundaries of the distributions of the species of, for example, such sharply different subgenera as *Euhieracium* and *Pilosella* have merged to a considerable extent, all the same the general tendency in the distribution of the subgenera is clearly evident: the species of *Euhieracium* are distributed in Europe (mainly in the montane regions), but the species of *Pilosella* are particularly diverse and abundant in the eastern plains of Europe (in the Soviet Union). This leads us to the idea of a possible polyphyletic evolution of this genus, and to suggest that systematists have combined four closely related but different genera under one name.

Although, in general, the genus *Hieracium* is of recent origin, nonetheless it can be presumed that its relatively well established forms had already emerged in the Tertiary Period. Under the influence of glaciation, many species migrated to refugia, among which the Carpathians and Balkans and, in part, the Urals are of interest for our forms, from which they again spread out in the Quaternary and historical epochs, but many forms gradually changed their habit from mesophytes to xerophytes under the influence of xerophilization. In most recent times a reversal of this tendency toward mesophily is noticeable.

As in all genera with a large number of species, in *Hieracium*, along with species that have been very unstable, readily changing the correlations of their characteristic features and habit under the influence of external factors, we also find species that have substantially or entirely lost their speciation flexibility and are represented to a well-known extent by "living fossils" (*H. triste* Willd., *H. hololeion* Maxim., *H. schmalhausianum* Litw. and Zahn, *H. transsilvanicum* Heuffel, and certain others). Moreover, all of them occupy a restricted geographic area.

Many prominent botanists have worked on the systematics of the genus *Hieracium*: Tournefort (1700), Wayne (1721), Linnaeus (1753), Tausch (1828), Froehlich (1838), Fries (1848, 1862), Bischoff (1851), 3 Grisebach (1852), Schultz brothers (1862) and others. All of these authors tried mainly to establish a generic identity of *Hieracium*

separate from *Crepis*. The first attempt at a monographic treatment of the genus (restricted, however, to Europe) was made by Naegeli and Peter (1885), who succeeded, however, in treating completely only the subgenus *Pilosella*. (From the subgenus *Euhieracium* they published only three sections: *Glaucina* and *Villosa* (1886) and *Glandulifera* (1889).) A great contribution to the further study of the systematics of the genus was made by two French Hieraciologists, Arvet-Touvet and Jordan, and particularly by a number of Scandinavian botanists such as Dahlstedt (1890), Elfstrand (1893), Norrlin (1906), Omang, Johanson, Samuelsson and others. Finally, the first comprehensive monographic treatment of the genus was published by the German botanist Herman Zahn (Engler's *Pflanzenreich*, IV, 280 (1921–1923)). In addition to this, Zahn had worked on the hawkweeds of Switzerland (Schinz and Keller. *Flora der Schweiz*, 1909), European Russia (in Fedtschenko and Flerov. *Flora Evropeiskoi Rossii* [Flora of European Russia], 1910), the Balkan Peninsula and Hungary (*Beitrag zur Kenntnis der Hieracium Ungarns u. der Balkanländern*, 1926) and had published compendia on the hawkweed flora of Central Europe (Hegi, *Flora von Mittel-europa*, VII. 1929; Ascherson u. Graebner. *Synopsis der Mitteleuropaischen Flora*, XII. 1930–1938). Zahn also worked on the hawkweeds of the former Moscow Province (*Hieracia florum Mosquensis*, 1911).

However, owing to the presence of an exceptionally large number of intermediate forms, at times connecting species of diverse origin and age, the task of establishing natural “phylogenetic” groups was difficult, apparently, even for Zahn.

Despite the fact that our hawkweeds repeatedly have been the subject of attention of such hieraciologists as Fries, Naegeli and Peter, Norrlin, Elfstrand, Zahn, Dahlstedt, Ganeshin and others, they have not yet been studied definitively. For such a treatment, material has not yet been collected sufficiently uniformly and systematically. In this context, the present treatment necessarily is also tentative in nature. In the treatment of the hawkweeds of the Soviet Union we mainly have followed the system proposed by Zahn, but with certain modifications mostly in the order of placement of subgenera and sections. As an example, we note that subgenus *Stenotheca*, which has retained the normal type of fertilization, is naturally considered by us as a more ancient subgenus, and the description of the genus should begin with it and not end with it (as in Zahn's monograph). Subgenera *Euhieracium* and *Pilosella*, being essentially apogamous, are, in our opinion, much younger. Similarly, it is appropriate to rearrange the sections within the limits of the subgenus. Thus, for example, section *Pseudostenotheca* with its more or less primitive species, which are close to the genus

Crepis naturally must be placed at the beginning of the system of subgenus *Euhieracium* (A. Grossheim did the same in the *Flora Kavkaza* [Flora of Caucasia], and not at the end as done by Zahn. Hints on the propriety of similar changes are contained in the later works of Zahn himself (1926, 1929, 1930–1938), but for some reason he did not take it further.

The descriptions of species by the older workers, as a rule, are distinguished by classical conciseness. It may be appropriate in other more cohesive genera, but when applied to the hawkweeds, it does not serve the purpose at all. In general recent researchers give more or less detailed diagnoses, which, however, could be still more complete, containing, for example, as far as possible more numerical data and indicating, surely, the corresponding section to which the described species belongs. Unfortunately, even at present authors often confine themselves to incomplete diagnoses, thereby leaving out data pertaining to significant characters, as a result of which we have unsatisfactory species descriptions, which in turn opens up a big field for errors. The most important characters in the identification of hawkweeds are: coefficient of leafiness, form of inflorescence, size of capitula (length of involucre), pubescence of involucre bracts and peduncles, length of achenes, color of stigmas (styles), shape and pubescence of leaves. It is clear from the above that hawkweeds must be collected when in full flower (in order to have mature achenes at least in the terminal capitulum). Plants collected too early or late, decayed or damaged, are mostly unsuitable for satisfactory identification. In order to avoid excessive problems in making a preparation (softening), the plants should be carefully spread before drying.

In comparing the species descriptions presented below with the original diagnoses, one soon can notice that they—as to the characterization of the degree of density of hairs (and also glands)—relatively rarely match verbatim and that, on the contrary, the characterizing terms are lowered in a majority of cases by one degree (and even more); thus the term “dense” has often been translated by us with the word “umerenno” [moderate], instead of the expected Russian word “gusto” [dense], “mediocriter”—as “rasseyanno” [scattered], and “dispersed”—as “skudno” [sparse], and so on. Such a “shift of concepts” had taken place that we did not find it possible to confine ourselves to only a simple translation of the diagnoses, but undertook a critical evaluation of the characters, and for this purpose we investigated again all herbarium material available to us. In doing so, it was found that in a majority of cases the characterization of the indumentum (which has such great significance in the identification of hawkweeds) apparently was done on the basis of a subjective impression, which

was different with different authors and even differed with the same person at different times. This could lead to instances when, for example, quantitatively absolutely equally pubescent plants received a different characterization, but species that differed in this regard were characterized by the same term. We shall confine ourselves to only one glaring example. It is customary to designate the degree of pubescence of the involuclral bracts, for example, in *H. alpinum* L. s. l. as "modice numerosi vel densissime," which on the average corresponds
 5 to the concept "crebre," and the degree of pubescence of such species as *H. chrysophthalmum* Norrl. or *H. inceptans* Norrl. or *H. prognatum* Norrl. and many others is characterized by exactly the same term. However, at the same time, the number of hairs on the involuclral bracts of the above named species equals 45(40–50), on average, in *H. alpinum* (L.) Backh.—130(60–250); in other words, 45 hairs equates in importance to 130 hairs!

In composing the species descriptions we chose to avoid a similar kind of confusion of concepts and, wherever possible, tried to reinforce the descriptive terms with numerical data representing the results of an analysis of authentic or other reliable material (issued exsiccatae, for example). In this respect we in turn built on the traditions that to the best of our knowledge were first used in the practice of identifying hawkweeds by J. Norrlin (Mela-Cajander, *Suomen. Kasvio* (1906) 621–623). In this context it is necessary to have in mind the following. The numerical data presented by us about the number of hairs always pertain to axial organs (stems, peduncles, petioles, midrib on the dorsal side, leaves and leaf margins), to a section 4 mm in length; the data relating to leaf surface have been converted to an area of 20 mm². On taxonomically very important organs like involuclral bracts, the number of hairs or glands was counted over the entire surface of the bract and the bracts with the best developed pubescence were considered; and besides, in order to avoid atypical counts, on an average up to five bracts per specimen were examined.

The average numerical data presented by us in the diagnoses represent the mean of averages, and they equate to the following descriptive definitions: 1) in the case of the axial organs and involuclral bracts: up to 10—occasional; up to 20—sparse; up to 30—scattered; up to 50—moderate; up to 80—dense; up to 100 and above—very dense; 2) in the case of the leaf surface: up to 5—sparse; up to 10—scattered; up to 15—moderate; up to 20—dense; up to 30 and above—very dense.

We consider it necessary to draw the attention of the users of the present volume to the fact that in cases when authentic or other completely convincing herbarium material was not available (as, for

example, happened quite often in section *Pseudostenotheca*, we necessarily had to confine ourselves to the use of descriptive terms.

The coefficient of leafiness is extremely important in the systematics of hawkweeds. It is obtained by dividing the number of cauline leaves (including also all the leaves that dried up to the time of flowering) by the length of stem in cm (measuring the latter from the root neck to the terminal capitulum).

KEY TO SUBGENERA AND SECTIONS

1. Achenes large, 2.5–4(–5) mm long, with ribs at tip fused into ring-like torus.....2.
- + Achenes small, 1–2(–2.5) mm long, with ribs at tip forming crenately toothed border (observed under strong magnifying glass) III. Subgenus **Pilosella** Tausch (p. 381). 16.
2. Involucral bracts distinctly 2-seriate; outer bracts few and quite short; inner bracts (without transition) considerably longer; achenes 2.5 mm long.....I. Subgenus **Stenotheca** Fr. (p. 9).
Section 1. **Aurelliformia** Fr. also included here.
- + Involucral bracts typically spiralled, multiseriate, distinctly imbricate, i.e., short outer bracts gradually change to longer inner bracts, less often indistinctly imbricate (2- or 3-seriate); achenes 3–4(–5) long.....II. Subgenus **Euhieracium** Torr. and Gray (p. 10). 3.
3. Involucral bracts not multiseriate, indistinctly imbricate (somewhat resembling *Stenotheca*); capitula usually few-flowered.....4.
- + Involucral bracts multiseriate, distinctly imbricate, spiralled; capitula usually many-flowered (as an exception, with few florets, see *H. transsilvanicum* Heuffel).....5.
4. Plants densely pilose throughout; leaves broad, amplexicaul; inflorescence dichotomous, with 1–5 large capitula (plants of Caucasus) 2. Section **Schmalhauseniana** Zahn (p. 10).
- + Plants glabrous or slightly pilose; leaves more or less narrow, narrowed into petiole or semiamplexicaul; inflorescence open panicle (more or less pseudodichotomous), usually with medium to small capitula.....3. Section **Pseudostenotheca** Fr. (p. 12)
- 5 (3). Late-flowering plants, usually without basal leaves at anthesis, but often also with withered lower cauline leaves; cauline leaves usually numerous; propagation through subaerial dormant buds producing stem in spring but not rosette (*Aphyllopoda* Godet).....6.
- + Stem usually with basal rosette of many (more rarely few) basal leaves; propagation through sessile rosette, dormant and persisting

- to anthesis (or withering only partly); cauline leaves few or absent altogether, less often numerous, distant (*Phyllopoda* Godet).....11.
6. Involucres and peduncles eglandular or with few minute glands; cauline leaves sessile with narrowed base, less often middle and upper leaves with round or broad base, very rarely slightly amplexicaul, never panduriform; ligule teeth not ciliate (*Accipitrina* Koch).....7.
- + Involucres and peduncles densely glandular; middle cauline leaves sessile, with broad or distinctly amplexicaul base, panduriform above enlarged base, with reticulate venation beneath, ligule teeth ciliate; achenes pale (gray, yellowish, bright- or reddish-brown, not black) 9. Section **Prenanthoidea** Koch (p. 112).
7. Coefficient of leafiness very high to somewhat high (1.60–0.30), i.e., cauline leaves numerous.....8.
- + Coefficient of leafiness low (0.30–0.10), cauline leaves usually fewer; involucre bracts appressed.....10.
8. Cauline leaves broad, middle and upper leaves mostly with broad base or even slightly amplexicaul; margins of receptacular pits long-fimbriately toothed; involucre bracts appressed.....9.
- + Cauline leaves mostly narrow, all alike, with narrowed base, usually sparsely floccose-tomentose on both sides; involucre bracts obtuse, almost always glabrous, outer bracts recurved (distinct in living plant); peduncles tomentose; inflorescence at least at tip (pseudo-)corymbose.....7. Section **Umbellata** Fr. (p. 83).
9. Peduncles glabrous like involucre bracts; leaves setose only along margin, beneath with reticulate venation; stigmas yellow.....5. Section **Foliosa** Peter (p. 74).
- + Peduncles tomentose; involucre bracts almost always glandular; leaves beneath with prominent veins, but without reticulate venation; stigmas dark (very rarely yellow).....6. Section **Sabauda** Fr. (p. 77).
- 10 (7). Plants conspicuously long setose; cauline leaves often crowded (in lower part of stem) like pseudo-rosette; involucres large (12–15 mm long); achenes pale (Caucasus).....4. Section **Clauiciformia** Freyn (p. 73).
- + Plants mostly weakly pilose; cauline leaves uniformly distributed on stem; involucres medium-sized (8–11 mm long); involucre bracts usually with few glands, hairs, and stellate indumentum; achenes dark to black.....8. Section **Tridentata** Fr. (p. 88).
- 11 (5). Whole plant (stem, leaves, inflorescence) covered with small glands and simple hairs; inflorescence unicapitulate or dichotomous, with few, usually large capitula; involucres shaggy from long hairs but

- without stellate pubescence; ligule teeth ciliate.....10. Section **Alpina** Fr. (p. 141).
- + Hairs, glands and stellate pubescence on plants in various combinations.....12.
12. Simple hairs plumose, i.e., teeth twice as long (or even more) as diameter of hair; leaves on both sides white-lanate from curly hairs and with tiny glands; inflorescence dichotomous or paniculate; capitula large (14–20 mm long); achenes straw-yellow to light brown.....11. Section **Pannosa** Zahn (p. 190).
- + Simple hairs only toothed, teeth usually not longer than diameter of hair.....13.
- 8 13. Involucral bracts irregularly imbricate; inner bracts almost equal in length, outer usually short and without distinct transition to inner 14.
- + Involucral bracts more or less regularly imbricate.....15.
14. Leaves bluish-green, along margin hispid and with tiny glands; teeth of florets ciliate; stigmas yellow; margins of receptacular pits toothed (plants of Kola Peninsula).....12. Section **Oreadea** Fr. (p. 193).
- + Leaves green, less often bluish-green, with soft curly hairs, without minute glands; ligule teeth (almost always) eciliate; stigmas usually dark; margin of receptacular pits not (or scarcely) toothed13. Section **Vulgata** Fr. (p. 195).
15. Involucres quite densely long-pilose (mane-like); whole plant white-tomentose with soft hairs; involucral bracts broad, long-acuminate.....14. Section **Villosa** Gris. (p. 378).
- + Involucres glabrous or sparsely hairy like whole plant; involucral bracts obtuse.....15. Section **Glauca** Gris. (p. 380).
- 16 (1). Stems terminating in pseudo-corymbose or paniculate inflorescence of many small capitula or (multi-)dichotomous; involucres 5–8 mm long; vegetative propagation through aerial or subaerial shoots and radical rosettes with sessile or petiolate leaves or lateral buds (*Cauligera* N.P.).....17.
- + Stems scapose, with one relatively large capitulum 8–12 mm long; all leaves in basal rosette, with stellate hairs beneath (very rarely on both sides), almost tomentose; vegetative propagation through stolons (*Acaulia* N.P.).....21. Section **Pilosellina** N.P. (p. 662).
17. Plants high; stem 20–80(100) cm high, erect, with 1– many leaves; inflorescence (multi-)dichotomous; capitula 7– many (*Cauligera elata* N.P.).....18.
- + Plants low; stems usually to 20 cm high, ascending, leafless or with 1–2 cauline leaves, stoloniferous; inflorescence with few capitula (*Cauligera humilia* N.P.).....20. Section **Auriculina** N.P. (p. 650).

18. Cauline leaves numerous; basal leaves usually withering before anthesis (*Poliophylla* N.P.); whole plant setose and stellate-pubescent; xerophytes, growing in steppes and semi-deserts.....16. Section **Echinina** N.P. (p. 381).
 + Cauline leaves fewer.....19.
 19. Stems hard; plants usually very sparsely hairy (few bristles) or almost glabrous; leaves bluish-green, narrow, lanceolate to linear; stolons either absent or long, slender, with many small leaves; involucre small, dark.....17. Section **Praealtina** N.P. (p. 418).
 9 + Stems soft, flattened; plants very conspicuously pubescent; leaves green or yellowish-green; elliptical to lanceolate.....20.
 20. Stolons absent (or weak, underground); leaves on both sides covered with stellate pubescence; cauline leaves usually with glands at tips.....18. Section **Cymosina** N.P. (p. 528).
 + Stolons developed (both aerial and underground); stellate indumentum on leaves absent or only beneath (sparsely); florets yellow or red.....19. Section **Pratensina** Asch. (p. 576).

Subgenus I. STENOTHECA FR. Symb. (1848) 132; Epicr. 140; Zahn in Pflzr. IV, 280 (1921) 32; (1922) 1075; Zahn in Asch. and Graebn. Synopsis, XII, I, 4.—Involucral bracts 2-seriate, outer bracts very small, without transition to inner bracts which are much longer; pappus uniseriate, of equal hairs, (dirty) white, fragile; inflorescence paniculate with small number of capitula, branches unicapitulate; vegetative propagation by sessile rosettes.

Of the 13 species of this essentially American subgenus only one monotypic section is found in the USSR.

Section 1. Aurelliformia Fr. Epicr. (1862) 145; Zahn in Pflzr. IV, 280, 1131.—Basal leaves numerous, obovate or spatulate, more or less hairy with scattered glands along margin; cauline leaves 2–3; involucre 9–11 mm long, very densely, dark lanate-pilose, with rare tiny glands, but without stellate pubescence.

1. **H. triste** Willd. ex Spr. Syst. veg. III (1826) 640; Froel. in DC. Prodr. VII, 209; Ldb. Fl. Ross. II, 853; Zahn in Pflzr. IV, 280, 1134; Kom. Fl. Kamch. III, 207.

Perennial. Rhizome often many-stemmed. Stem 10–30 cm high, simple, bent in upper part; sparsely below but densely pilose above with long and soft hairs, scatteredly glandular, to stellate-pubescent. Basal leaves 3–6(9), often large, very long- and narrow-petiolate, obovate or spatulate, with obtuse (with spine) or somewhat acute tip, grayish-green (brownish on drying), almost entire or (sometimes)

slightly undulate, glabrous above, sparsely or scatteredly pilose beneath and along petioles, along margin finely glandular; cauline leaves 2–3, lower large, lanceolate, petiolate, densely pilose along margin and beneath, remaining leaves narrow to linear-lanceolate, pubescent, very sparsely stellate-pubescent beneath. Inflorescence paniculate, with 2–3(5) capitula (branches uncapitulate). Peduncles densely pilose, slightly glandular, tomentose from stellate fluff. Involucres 9–11 mm long, ovate (later globose); involucre bracts somewhat broad or narrow, obtuse, or inner bracts acute, black, dark lanate, smoky (hence the name); hairs 3–10 mm long, sparsely fine-glandular, without stellate pubescence. Florets small (often tubular); stigmas dark. Achenes 2.5 mm long, blackish; pappus dirty white or yellowish. Flowering July to September. (Plate I.)

Alpine and subalpine grasslands, slopes of hills, descending here to river valleys, and tundra.—*Far East*: Kamchatka. *General distribution*: Beringia. Described from Alaska? Type in Berlin.

Subgenus II. EUHIERACIUM TORR. and GRAY in Fl. N.-Am., II (1838) 575; Zahn in Pflzr. IV, 280, 32; Zahn in Asch. and Graebn. Synopsis, XII, II, 1.—*Archieracium* Fr. Epicr. (1862) 42.—Involucral bracts spiralled (multiseriate-imbricate); small outer bracts changing to long inner bracts gradually or (less often) more or less abruptly (cf. section *Pseudostenotheca*). Leaves usually toothed, deeply incised, rarely entire. Pappus usually 2-seriate of unequal hairs—long and short intermixed, dirty-white or yellowish, rarely pure white (cf. *H. transsilvanicum* Heuffel); hairs stiff and fragile. Vegetative propagation by dormant buds or rosettes; rhizome never producing shoots, reproduction usually apogamous and, only as an exception, normal.

Section 2. Schmalhauseniana Zahn in Pflzr. IV, 280 (1922) 1075.—Monotypic section with a single species; characteristics of the section as in the key.

2. H. schmalhausenianum Litw. and Zahn in Fedde, Repert. IV (1907) 326; Zahn in Pflzr. IV, 280, 1075; Grossh. Fl. Kavk. IV, 266.—*H. atrocephalum* Schmalh. in Ber. Deutsch. Bot. Ges. X (1892) 290.—**Ic.**: Zahn, op. c.—**Exs.**: Zahn, Hier. Europ. No. 400; GRF No. 2085.

Perennial. Stem 45–60 cm high, slender to thick, angular, often flexuous, basally or throughout colored, throughout densely setose-hairy, hairs to 3 mm long, with dark, thick base and light tip or entirely dark. Basal leaves like lower cauline leaves withering before anthesis; cauline leaves 25–40, very crowded (coefficient of leafiness, on average, 0.55), lanceolate or oblong-lanceolate, semiamplexicaul,



- gradually decreasing in size, middle leaves broader (3.5:1), elliptical or ovate-lanceolate, short-acuminate and spinescent or subacute, sometimes plicate, upper leaves very distant, all entire, light green, stiff, somewhat lustrous above, paler beneath with reticulate venation, moderately hairy on both sides, hairs 2–3 mm long with bulbous base, eglandular, and without stellate pubescence. Inflorescence shallowly dichotomous, with 1–3(–5) capitula; branches unicapitulate, thickish, dark-green, with antrorse bristles 2–4 mm long and sparse stellate pubescence, but with quite dense, tiny glands 0.2 mm long. Involucres 11–12 mm long, saccate-globose; involucre bracts indistinctly imbricate, outer bracts small, narrow and obtuse, inner broader (2.0 mm wide), somewhat obtuse or acute, dark green, with greenish border, sparsely pubescent (0–24) with hairs 1.5 mm long and very densely (80–200) glandular (glands 0.2–1.5 mm long, yellow), without stellate pubescence. Florets yellow; ligule teeth glabrous; stigmas yellow, turning brown. Achenes light reddish-brown. Flowering July.

Open herb slopes.—*Caucasus*: Ciscaucasia. Endemic. Described from Kislovodsk. Type in Leningrad.

Section 3. *Pseudostenotheca* Fr. Epicr. (1862) 138 p. p. (sub *Hololeia*); Pflanzenfam. IV, 5, 386; Zahn in Pflzr. IV, 280 (1921) 36, (1922) 1014; in Asch. and Graebn. Synopsis, XII, III, 636.—Involucre bracts usually few, appressed, obtuse (very rarely more or less acute), outer short, inner much longer and then involucre bracts seemingly 2–3-seriate (typical forms), less often indistinctly imbricate (transitional forms). Florets in capitulum more or less few, sometimes tubular. Inflorescence openly (corymbose) paniculate with pseudodichotomous branching. Plants more or less sparsely hairy (densely hairy forms are exceptions). Basal leaves either withering before anthesis and then cauline leaves quite numerous (coefficient of leafiness high, 0.63–0.20) or more or less well developed, and then cauline leaves few (coefficient of leafiness 0.18–0.04); leaves with elongate, uniformly broad and often amplexicaul base, sessile, light blue.

Note. This section, rich in forms, constitutes, in a morphological-geographical respect, a bridge as it were between subgenera *Stenotheca* and *Euhieracium*, indicating their phyletic link. Its representatives grow in the vast area stretching with gaps from the eastern part of Central Europe to the Far East, with the majority of the forms concentrated in the Balkans-Asia Minor and Caucasian regions, and only isolated links of this, evidently never unbroken chain are present in Central Asia (*H. arysynense*, *H. alatavicum*, *H. kirghisorum*) and in the Far East (*H. hololeion*). The vast area and disjunct distribution indicate the ancient origin of this section. In Zahn's opinion this

section originated more or less along with sections *Umbellata* and *Foliosa* from a single prototype.

Some species now listed as endemic (in the Caucasus) may in the future be discovered in Asia Minor and Iran, when these countries are surveyed more thoroughly floristically. It is commonly known that until now these countries have been surveyed most inadequately.

1. Coefficient of leafiness very high (0.68–0.56): cauline leaves many (40–18); basal leaves (and lower cauline leaves) withering before anthesis.....2.
- + Coefficient of leafiness lower (0.40–0.04).....7.
2. Involucral bracts pubescent.....3.
- + Involucral bracts (and peduncles) glabrous.....6.
3. Peduncles conspicuously pubescent.....4.
- + Peduncles glabrous or with occasional hairs.....5.
4. Glands on involucral bracts many, on peduncles absent; leaves broad (2.5:1); stem densely pubescent in lower part.....4. **H. podkumokense** Juxip
- + Glands on involucral bracts and peduncles few; leaves narrower (4.5:1); stem scatteredly pubescent in lower part.....12. **H. chaetothyrsium** Litw. and Zahn
5. Peduncles eglandular; stem in lower part densely long-pilose (6–7 mm long); leaves broad (3:1), densely pubescent (on both sides); stigmas yellowish-brown.....9. **H. cincinnatum** Fr.
- + Peduncles sparsely glandular; stem in lower part moderately covered with hairs 2 mm long; leaves narrower, scatteredly pubescent (glabrous above, more or less pubescent beneath); stigmas dark.....**H. orthocladum** Zahn
6. Glands on involucral bracts present, on peduncles absent; stigmas dark.....10. **H. virosiforme** Woron. and Zahn
- + Glands on involucral bracts and peduncles numerous; stigmas yellowish-brown.....3. **H. adenobrachion** Litw. and Zahn
- 7 (1). Coefficient of leafiness quite high to moderate (0.40–0.20).....8.
- + Coefficient of leafiness lower (0.18–0.04).....36.
8. Coefficient of leafiness more or less high (0.40–0.34), i.e., cauline leaves 10–32; basal leaves withering before anthesis.....9.
- + Coefficient of leafiness moderate (0.30–0.20), i.e., cauline leaves 7–20(27); basal leaves usually withering before anthesis, very rarely 1–2 leaves persisting.....18.
9. Involucral bracts pubescent.....10.
- + Involucral bracts (and peduncles) glabrous.....15.
10. Hairs on involucral bracts numerous or few.....11.

- + Hairs on involuclral bracts occasional (5–10), glands numerous (110); peduncles with fewer (50) glands to 0.8 mm long; stigmas yellowish-brown; leaves broad (3:1).....6. **H. gigantellum** Litw. and Zahn
- 11. Hairs on involuclral bracts quite numerous.....12.
- + Hairs on involuclral bracts few.....13.
- 12. Hairs on peduncles quite numerous; glands on involuclral bracts and peduncles also numerous.....13. **H. obscuricaule** Litw. and Zahn
- + Peduncles glabrous; glands on involuclral bracts few, peduncles eglandular.....18. **H. artvinense** Woron. and Zahn
- 13. Peduncles scatteredly pubescent and with occasional glands.....14.
- + Peduncles glabrous (or with occasional hairs); inflorescence dichotomously paniculate, with 2–4 capitula; leaves stellate-pubescent on both sides, involuclral bracts moderately stellate-pubescent.....26. **H. gothicifrons** Zahn
- 14. Glands on involuclral bracts fewer; leaves narrow-lanceolate (6–7:1), scatteredly pubescent; stem slightly pubescent; involuclres to 12 mm long; stigmas yellow.....17. **H. terekianum** Litw. and Zahn
- + Glands on involuclral bracts numerous (110); leaves broader (4.5:1), varying to densely pubescent; stem densely pubescent at base; involuclres large, 13–14 mm long; stigmas dark.....8. **H. chlorochromum** Sosn. and Zahn
- 15 (9). Involuclral bracts with scattered glands.....16.
- + Involuclral bracts with numerous (110) glands; peduncles with few glands; stigmas yellowish-brown.....6. **H. gigantellum** Litw. and Zahn
- 16. Peduncles eglandular (or with occasional glands).....17.
- + Peduncles with fewer glands; leaves closely and sharply serrate.....16. **H. panjutinii** Juxip
- 17. Leaves narrow-lanceolate (7.5:1), all entire; stem with occasional hairs or almost glabrous; involuclres (7–)8–9 mm long, glands on them 0.2–0.3 mm long.....19. **H. foliosissimum** Woron. and Zahn
- + Leaves broader (5.5:1), lower leaves finely toothed, upper entire; stem in lower part densely covered with stiff hairs 3 mm long; involuclres 11 mm long; glands on them well developed (0.2–0.5 mm long).....20. **H. subartvinense** Juxip
- 18 (8). Involuclral bracts with few (conspicuous) hairs.....19.
- + Involuclral bracts glabrous or with occasional hairs.....31.
- 19. Hairs on peduncles in appreciable number (scattered to dense).....20.
- + Peduncles glabrous or with occasional hairs.....27.

20. Glands on involuclral bracts occasional to moderate in number21.
- 16 + Glands on involuclral bracts dense, stigmas dark.....28.
21. Glands on involuclral bracts occasional to scattered (30).....22.
- + Glands on involuclral bracts up to moderate (60) in number.....24.
22. Peduncles eglandular; leaves glabrous; involuclres 9–10 mm long; stigmas dark (plants of Central Asia).....43. *H. alatavicum* Zahn
- + Glands on peduncles occasional to sparse; leaves sparsely pubescent (plants of the Caucasus).....23.
23. Involuclres 8–9 mm long; stigmas yellowish-brown; leaves on both sides densely stellate-pubescent; inflorescence branches upward directed at acute angle to stem, with many (25) capitula.....36. *H. acutangulum* Kozl. and Zahn
- + Involuclres 10–12.5 mm long; stigmas dark; leaves sparsely stellate-pubescent only beneath; inflorescence branches dichotomous, divergent, with few (7) capitula; number of glands on involuclral bracts exceeding simple hairs (ratio 60:40).....29. *H. sulphurellum* Kozl. and Zahn
24. Leaves very sparsely pubescent (almost glabrous); stem moderately pubescent at base; involuclres 9–10 mm long; stigmas dark 32. *H. rigidellum* Litw. and Zahn
- + Leaves densely pubescent, like stem at base; involuclres 10–11 mm long.....25.
25. Stigmas dark.....15. *H. chaetothyrsoides* Litw. and Zahn
- + Stigmas yellow.....11. *H. syreistschikovii* Zahn
26. Leaves, like stem, densely pubescent.....7. *H. streptotrichum* Zahn
- + Leaves, like stem, sparsely pubescent.....14. *H. chloroprenanthes* Litw. and Zahn
- 27 (19). Peduncles eglandular or with occasional glands; glands on voluclral bracts occasional or few.....28.
- + Peduncles with numerous glands; involuclral bracts with scattered glands; stigmas yellowish-brown.....31. *H. caucasiense* Arv.-Touv.
28. Stigmas dark.....29.
- + Stigmas yellow; involuclres 9–10 mm long; inflorescence with fewer (up to 10) capitula.....30.
29. Involuclres 9.5 mm long, involuclral bracts densely stellate-pubescent; florets tubular; inflorescence with numerous capitula (25–40).....34. *H. beschtavicum* Litw. and Zahn
- + Involuclres 10.5–14 mm long; involuclral bracts weakly stellate-pubescent; florets ligulate; inflorescence mostly with few capitula; leaves broadly lanceolate (3:1), with round base; hairs on involuclral bracts exceeding glands (ratio 70:30).....27. *H. litwinowianum* Zahn

30. Stellate pubescence only beneath on subtending leaves.....33. **H. callichlorum** Litw. and Zahn
 + All leaves stellate-pubescent on both sides (more densely beneath).....35. **H. tzagwerianum** Kozl. and Zahn
- 31 (18). Involucral bracts with fewer (12–20), tiny (0.1–0.2 mm long) glands, glabrous like peduncles; stigmas yellow; leaves broad (3:1) (plants of Central Asia).....25. **H. kirghisorum** Juxip
 + Involucral bracts with few or numerous larger glands (0.3–0.5 mm long).....32.
32. Glands on involucral bracts scattered to moderate in number.....33.
 + Glands on involucral bracts varying to dense, involucre 8–9.5 mm long.....35.
33. Glands on involucral bracts 25–50.....34.
 + Glands on involucral bracts 50–80; peduncles with occasional (2–8) glands; leaves almost entire (6:1), somewhat panduriform, almost glabrous; stigmas dark.....24. **H. leptoprenanthes** Litw. and Zahn
34. Involucre quite large, 10.5 mm long; stigmas greenish-yellow; leaves broad (3.5:1), distinctly sharply serrate, stellate-pubescent on both sides, midrib prominent and bright beneath.....28. **H. ermaniense** Juxip
 + Involucre 9–10 mm long; stigmas black; leaves narrower (6:1), almost entire, stellate-pubescent only beneath.....21. **H. microtum** Boiss.
35. Peduncles with occasional, very tiny glands 0.1–0.2 mm long; leaves almost entire.....23. **H. chromolepium** Zahn
 + Peduncles very densely glandular; leaves with numerous short teeth.....22. **H. pseudoconstrictum** Zahn
- 36 (7). Coefficient of leafiness relatively low (0.18–0.10): cauline leaves 2–12; basal leaves 0–few.....37.
 + Coefficient of leafiness very low (0.09–0.04): cauline leaves (5)4–1; basal leaves mostly well developed.....69.
37. Involucral bracts very densely to scatteredly pubescent.....38.
 + Involucral bracts glabrous or with fewer hairs; stigmas dark.....48.
38. Involucral bracts moderately pubescent.....39.
 + Involucral bracts scatteredly pubescent.....41.
39. Glands on involucral bracts moderate (60) in number; involucre 10.5–12 mm long; leaves almost entire; florets usually tubular.....54. **H. svaneticiforme** Litw. and Zahn
- 18 + Glands on involucral bracts sparse; involucre 8–10 mm long; leaves serrate toothed.....40.

40. Leaves on both sides stellate-pubescent (upper leaves very densely so), like involucre bracts; stem at base densely, in upper part only slightly, hairy.....37. **H. kochtanum** Kozl. and Zahn
 + Leaves not stellate-pubescent; stem at base only slightly, but in upper part densely, white-sericeous, like leaves on veins beneath and along petioles.....49. **H. sericicaule** Schelk. and Zahn
41. Peduncles moderate to sparsely pubescent; leaves (mainly upper) slightly stellate-pubescent beneath.....42.
 + Peduncles with occasional hairs.....44.
42. Glands on involucre bracts (and peduncles) occasional; involucre 10 mm long; florets tubular; stem at base villous, with hairs 3–4 mm long.....59. **H. villosellipes** Zahn
 + Glands on involucre bracts (and peduncles) few; involucre 8–9 mm long.....43.
43. Stigmas blackish; leaves slightly pubescent; only petioles villous; florets often tubular.....67. **H. samurense** Zahn
 + Stigmas yellow; leaves sparsely pubescent beneath, glabrous above.....44. **H. acroxanthum** Sosn. and Zahn
44. Stigmas yellow; involucre bracts and peduncles with occasional glands.....45.
 + Stigmas dark.....46.
45. Involucres 10–12 mm long (plants of the Caucasus).....48. **H. onosmaceum** Zahn
 + Involucres 9–10 mm long (plants of Central Asia).....66. **H. aryslynense** Zahn
46. Glands on involucre bracts and peduncles (almost) completely absent; upper leaves on both sides slightly stellate-pubescent.....45. **H. bakurianense** Fom. and Zahn
 + Glands on involucre bracts occasional or sparse; leaves narrow-lanceolate (8–7:1).....47.
47. Florets tubular; stem almost glabrous.....38. **H. biebersteinii** Litw. and Zahn
 + Florets ligulate; stem in lower part very densely covered with white hairs 3–5 mm long.....39. **H. hypopogon** Litw. and Zahn
- 48 (37). Hairs on involucre bracts varying to sparse.....49.
 + Hairs on involucre bracts absent.....62.
49. Peduncles with occasional (or to sparse) hairs.....50.
 + Peduncles glabrous.....57.
50. Glands on involucre bracts occasional or to sparse.....51.
 + Glands on involucre bracts moderate to dense.....52.
51. Cauline leaves 6–8, almost entire; involucre 10–11 mm long.....30. **H. sulphurelliforme** Kozl. and Zahn

- + Cauline leaves 3–4, denticulate; involucre 9–10.5 mm long.....68. **H. macrolepioides** Zahn
- 52. Glands on involucre bracts moderate in number.....53.
- + Glands on involucre bracts more or less dense.....55.
- 53. Glands on peduncles occasional; plants almost without stellate pubescence; stem sparsely hairy.....54.
- + Glands on peduncles dense; stellate-pubescence of plants conspicuous; stem distinctly hairy at base.....60. **H. miansarofii** Kozl. and Zahn
- 54. Cauline leaves 4–8; involucre 10–12.5 mm long.....52. **H. simplicicaule** Somm. and Lev.
- + Cauline leaves 3–6; involucre 12–14 mm long.....56. **H. lailanum** Schelk. and Zahn
- 55. Glands on involucre bracts moderately or densely (40–80) developed; on peduncles occasional (on the whole, glands on plant moderate in number).....56.
- + Glands on involucre bracts densely (80) developed, on peduncles sparsely so (on the whole dense).....61. **H. subbakurianiense** Juxip
- 56. Involucre bracts and peduncles with occasional hairs; cauline leaves conspicuously less pubescent than basal leaves.....50. **H. macrolepis** Boiss.
- + Involucre bracts and peduncles with sparse (16–20) hairs; stem distinctly hairy at base.....50. **H. macrolepis** var. **pilosius** Litw. and Zahn
- 57 (49). Involucre bracts with sparse (-20) glands; cauline leaves 3–4.....68. **H. macrolepioides** Zahn
- + Involucre bracts sparsely to densely glandular.....58.
- 58. Involucre bracts to moderately glandular.....59.
- + Involucre bracts densely glandular.....61.
- 59. Cauline leaves 8–10, densely (like stem at base) pubescent; involucre 8–10 mm long; involucre bracts grayish-pubescent from stellate hairs.....47. **H. chloroleucolepium** Kozl. and Zahn
- + Cauline leaves 4–5, like stem sparsely pubescent; involucre 11–13 mm long; involucre bracts only in part stellate-pubescent (at base).....60.
- 60. Peduncles almost eglandular; basal leaves serrate-toothed; cauline leaves entire; florets ligulate.....53. **H. concinnidens** Zahn
- 20 + Peduncles moderately glandular; all leaves finely toothed; florets tubular.....51. **H. kiderense** Zahn
- 61 (58). Involucre large, 11–11.5 mm long; involucre bracts usually without stellate hairs.....61. **H. subbakurianiense** Juxip

- + Involucres smaller, 8–9 mm long; involucral bracts densely stellate-hairy; florets partly tubular.....40. **H. chlorophilum** Kozl. and Zahn
- 62 (48). Peduncles slightly pubescent.....63.
- + Peduncles always glabrous.....65.
- 63. Peduncles always hairy, white-tomentose from stellate hairs.....42. **H. niphocladum** Schelk. and Zahn
- + Peduncles with occasional hairs, often without; grayish-tomentose from scattered hairs.....64.
- 64. Involucres 9–10 mm long; involucral bracts with scattered glands; basal leaves finely toothed; cauline leaves almost entire.....69. **H. macrolepidiforme** Zahn
- + Involucres 10–12 mm long; involucral bracts with sparse glands; all leaves finely toothed; cauline leaves small.....55. **H. subsimplex** Somm. and Lev.
- 65. Involucral bracts and peduncles always glandular.....66.
- + Involucral bracts and peduncles eglandular; plants glabrous.....68.
- 66. Glands on involucral bracts sparse (20–25), occasional on peduncles.....46. **H. diaphanoidiceps** Woron. and Zahn
- + Glands on involucral bracts and peduncles moderate in number.....67.
- 67. Involucres large, 11.5 mm long; florets tubular.....51. **H. kiderense** Zahn
- + Involucres smaller, 9 mm long; florets ligulate; stigmas black.....41. **H. medschedsense** Zahn
- 68. Leaves broad, finely toothed; involucres small, 8–9 mm long (plants of the Caucasus).....57. **H. georgicum** Fr.
- + Leaves narrow (ratio of length to width 20–30:1) entire; involucres large, 10–12(15) mm long (plants of the Far East).....58. **H. hololeion** Maxim.
- 69 (36). Hairs on involucral bracts moderate in number to sparse.....70.
- + Hairs on involucral bracts absent.....79.
- 70. Hairs on involucral bracts moderate in number to scattered.....71.
- + Hairs on involucral bracts sparse or occasional.....74.
- 71. Stigmas dark; peduncles glabrous; involucres 9 mm long.....63. **H. sobrinatum** Litw. and Zahn
- + Stigmas yellow.....72.
- 21 72. Involucres 10–12 mm long.....71. **H. brandisianum** Zahn
- + Involucres 8–10 mm long.....73.
- 73. Peduncles scatteredly glandular; leaves moderately hairy, finely toothed; inflorescence with 7–15 capitula in a glomerule in upper part.....72. **H. glomerellum** Zahn

- + Peduncles densely glandular; leaves densely pubescent, almost entire; inflorescence with 2–3 capitula.....62. **H. tschkhubianischwillii** Kem.-Nat.
- 74(70). Hairs on involucre bracts sparse (8–24); stigmas yellow.....75.
- + Hairs on involucre bracts, as also on peduncles, occasional (sometimes completely absent).....76.
- 75. Glands on involucre bracts scattered to moderate in number (40), 0.3–0.4 mm long; florets ligulate; leaves ovate-lanceolate, broad (3:1), abruptly narrowed in petiole.....76. **H. caloprasinum** Zahn
- + Glands on involucre bracts dense (75), 0.5–1 mm long; florets tubular; leaves lanceolate, narrow (5–7:1), gradually narrowed to petiole.....65. **H. subsvaneticum** Litw. and Zahn var. **normale** Zahn
- 76. Stigmas yellow; involucre bracts with scattered (40), glands 0.4–1 mm long; involucre 10–11.5 mm long.....73. **H. erythrocarpum** Peter
- + Stigmas dark.....77.
- 77. Involucre large, (9–)10–12(–13) mm long; involucre bracts moderately (30–50) glandular, glands 0.4–0.5 mm long.....78.
- + Involucre smaller, 8–10 mm long; involucre bracts and peduncles densely glandular, glands 0.2–0.4 mm long.....64. **H. pseudosvaneticum** Peter
- 78. Involucre bracts sparsely (30) glandular; leaves boldly lobate-toothed (particularly at base of lamina).....77. **H. insolitum** Zahn
- + Involucre bracts moderately (50) glandular.....78. **H. artabirensense** Zahn
- 79 (69). Peduncles sparsely hairy, (almost) eglandular; stigmas yellow; involucre bracts mottled from dense stellate pubescence.....79. **H. variegatisquamum** Zahn
- + Peduncles glabrous.....80.
- 80. Involucre bracts moderately glandular.....81.
- + Involucre bracts densely glandular.....83.
- 81. Stigmas yellow; involucre bracts with scattered (40) glands 0.4–1 mm long; peduncles with sparse glands.....73. **H. erythrocarpum** Peter
- 22 + Stigmas dark.....82.
- 82. Involucre (9–)12(–13) mm long; leaves sparsely hairy (basal and cauline leaves uniformly so).....78. **H. artabirensense** Zahn
- + Involucre 8.5–9.5 mm long; basal leaves sparsely hairy, cauline leaves 4 times more densely hairy; upper leaves stellate-pubescent.....74. **H. heterodontoides** Litw. and Zahn
- 83. Stigmas dark.....84.
- + Stigmas yellow.....86.

84. Peduncles scatteredly pubescent, glands 0.4–0.5 mm long; involucre 9–11 mm long.....85.
 + Peduncles more or less densely glandular; involucre 9–10 mm long; florets usually tubular.....75. **H. ratluense** Zahn
85. Stem at base (sparsely) white-hairy; leaves sparsely pubescent, basal and cauline leaves similarly pubescent.....
80. **H. albellipes** Schelk. and Zahn
 + Stem with occasional hairs (almost glabrous); basal leaves moderately hairy; cauline leaves almost glabrous.....
81. **H. erythrocarpoides** Litw. and Zahn.
- 86 (83). Peduncles scatteredly glandular; involucre bracts glabrous, slightly stellate-hairy; leaves without stellate hairs; florets tubular.....65. **H. subsvaneticum** Litw. and Zahn f. **kochtae** Zahn
 + Peduncles densely glandular; leaves stellate pubescent beneath; involucre bracts densely stellate-pubescent and shaggy at apex; florets ligulate.....70. **H. amphitrophodes** Sosn. and Zahn

Cycle 1. Gigantella Juxip.—Cauline leaves many (20–40); coefficient of leafiness high (average 0.40), basal leaves withering before anthesis; involucre 10–12 mm long; glands on involucre bracts very dense, large and small (0.2–1 mm long); leaves sparsely pubescent.

3. **H. adenobrachion** Litw. and Zahn in Fedde, Repert. IV (1907) 325; Zahn in Pflzr. IV, 280, 1071.

Perennial. Stem 60 cm high, thick, at base violet and glabrous, hairy above to inflorescence (base of hairs bulbous, dark). Basal leaves withering before anthesis; cauline leaves to 40 (coefficient of leafiness to 0.67), broadly lanceolate, acute, lower leaves with tapered base, sessile, more or less crowded, others with round, nearly amplexicaul base or even auriculate, middle leaves sometimes somewhat panduriform, often violet or reddish, all leaves finely toothed and almost
 23 always with 2–3 large teeth, somewhat (to moderately) covered on both sides with stiff hairs or more or less glabrous above, sparsely stellate-pubescent and with inconspicuous reticulate venation beneath. Inflorescence open panicle, with 10–15(–20) capitula; peduncles thick, glabrous, very densely stalked-glandular, more or less grayish-tomentose. Involucre 10.5–12 mm long; involucre bracts somewhat narrow, subobtusate, without hairs but with dense yellowish (mixed with small) glands, sparsely stellate-pubescent; ribbed. Stigmas yellowish-brown. Achenes dark brown. Similar to *H. bupleurifolioides* Zahn in habit. Flowering July to August.

Mountains at 900–1200 m.—**Caucasus**: Ciscaucasia. Endemic. Described from Pyatigorsk (Beshtau). Type unknown.

4. **H. podkumokense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 467.

Perennial. Stem 35–40 cm high, 1.5–2.3 mm in diameter, violet at base, all along (particularly conspicuously at base) covered with numerous hairs 2.5 mm long, somewhat stellate-pubescent above. Basal leaves (like 10–12 lower cauline leaves) withered at anthesis; cauline leaves 20–30 (coefficient of leafiness 0.65), broadly lanceolate (2.5:1), sessile, with broadly rounded semiamplexicaul base, short-acuminate, entire, with reticulate venation beneath, involute, glabrous above and along margin, with occasional hairs beneath 1.5 mm long, along midrib to dense, as a whole to scattered, not stellate. Inflorescence dichotomous-paniculate, with 1–2 capitula; peduncles moderately hairy, light-colored, with dark base, stiff, eglandular sparsely stellate-hairy. Involucres 10 mm long; involucral bracts dark, with occasional 4(0–12), stiff hairs 1 mm long and very densely glandular 123(66–190), glands large and small (0.2–1 mm long), somewhat stellate-pubescent only at base. Flowering June to July.

Mountains.—*Causasus*: Ciscaucasia. Described from Kislovodsk. Type in Leningrad.

Note. On the label is this annotation in the hand of D.I. Litwinov (?): "*H. muricellum* Fr. det. Zahn"—the specimen does not conform to this species; H.G.A. Dahlstedt, who apparently also had seen it, designated the plant a "spec. nova."

It is close to *H. gigantellum* Litw. and Zahn, differing from it mainly by distinctly hairy peduncles (hairs setaceous, 3 mm long, light-colored with a blackish base) and the absence of glands, as well as by a more densely pubescent stem.

5. **H. orthocladum** Zahn in Fedde, Repert. IV (1907) 326; Pflzr. IV, 280, 1070.—*H. strictissimum* Peter, Beitr. Hier. Osteur. Orient. (1898) 37, nec Froel. ex Somm. and Lev. (1900).

- 24 Perennial. Stem 50–70 cm high, erect, hard, sulcate, covered only in lower part with soft, light-colored hairs 2 mm long. Basal leaves withering before anthesis; cauline leaves numerous, lower lanceolate, narrowed to long petiole, acuminate, middle leaves with cordate, amplexicaul base, often somewhat panduriform, long-acuminate, upper leaves with cordate base, long-acuminate; all leaves obliquely upward-directed, slightly undulate, sparsely serrate-toothed or almost entire, reticulately veined beneath, somewhat or densely covered along veins and margin with hairs 2 mm long, without stellate hairs, glabrous. Inflorescence openly paniculate, with straight, obliquely upward-directed branches bearing 12–15 capitula; peduncles glabrous, sparsely glandular, tomentose, with dark subulate bracts. Involucres 11 mm

long, ovate; involucre bracts broad, subobtusate, somewhat dark, with narrow light-colored border, outer bracts loose, with few dark hairs 1 mm long, moderately glandular, without stellate hairs. Stigmas dark. Achenes light brown, 4 mm long. Flowering July to August.

Subalpine zone, to 2100 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Svanetia (Latpari). Type unknown.

6. *H. gigantellum* Litw. and Zahn in Fedde, Repert IV (1907) 325; Zahn in Pflzr. IV, 280, 1070; Grossh. Fl. Kavk. IV, 268.—*H. racemosum* Fr. Epicr. (1862) 128 p. p.; Schmalh. Fl. II, 160 (quoad locum Beschtau).

Perennial. Stem 45–85 cm high, 3–6 mm in diameter, somewhat woody and violet at base, moderately hairy (hairs 1.0–1.5 mm long) to middle or scabrous from spiny hairs (and then almost glabrous), eglandular, sparsely stellate-pubescent above. Basal leaves, like lower cauline leaves, withering before anthesis; lower cauline leaves 20–30 (average coefficient of leafiness 0.38), broadly or ovately lanceolate, to 15 cm long and 3 cm wide or narrower (to 1.5 cm wide), sparsely finely toothed or almost entire, all sessile, semiamplexicaul; lower leaves with long, short, tapered base; upper leaves with broad base, acute, glabrous above, up to sparsely pubescent beneath, with occasional hairs along bent margin or scabrous from bulbously thickened spiny (stubby) hairs, olive-green, slightly lustrous, much paler beneath. Inflorescence openly paniculate with short branches bearing 10–25(–30) capitula, in part undeveloped; peduncles glabrous or with occasionally stiff hairs 1.5 mm long, moderate number of glands 0.5 mm long, grayish-green from stellate hairs. Involucre 10–12 mm long; involucre bracts lanceolate, obtuse, dark green, irregularly imbricate; outer bracts narrower, more loosely arranged and dark, inner with green border, almost glabrous or with occasional (5–11), stiff hairs 1 mm long and numerous, 111(106–115), long (to 1 mm) and short (0.2 mm long) glands, usually without stellate hairs. Stigmas initially
25 yellowish-brown, later dark. Achenes dark brown. Flowering July to August.

Mountains to 1440 m.—*Caucasus*: Ciscaucasia, Western Transcaucasia. Endemic. Described from Pyatigorsk (Beshtau). Type in Tbilisi; cotype in Leningrad.

7. *H. streptotrichum* Zahn in Fedde, Repert. IV (1907) 326; in Pflzr. IV, 280, 1070.—*H. strictum* Peter, Beitr. Hier. Osteur. Orient. (1898) 24, nec. Fr.

Perennial. Stem 60 cm high, densely hispid, above with scattered stellate-pubescent. Basal leaves withering before anthesis(?); cauline

leaves to 20, gradually decreasing, lower leaves oblong-lanceolate, more or less panduriform toward base, with cordate, semiamplexicaul base, acute, finely short-toothed, densely hairy (less stiff) on both sides, hairs 3–4 mm long along margin and midrib beneath. Inflorescence openly paniculate, with 10–15 capitula; peduncles tomentose. Involucres 10–12 mm long; involucre bracts irregularly imbricate, somewhat broad and dark, almost moderately dark hairy, densely short-glandular mixed with long glands at base, somewhat stellate-hairy along margin and at base. Stigmas dark. Achenes brown. Flowering August.

Caucasus: Western Transcaucasia. Endemic. Described from Svanetia (Latpari). Type unknown.

Note. This description is based on Peter's highly incomplete diagnosis. Although supplemented by Zahn, it is unsatisfactory all the same.

Cycle 2. *Chlorochroma* Juxip.—Cauline leaves many (20) (coefficient of leafiness 0.40); basal leaves withering before anthesis; inflorescence very densely glandular with tiny glands 0.2–0.3 mm long; involucres 13–14 mm long; leaves densely covered with bristles 3–4 mm long; stem densely covered at base with white hairs 5 mm long.

The type species of this cycle, *H. chlorochromum* Sosn. and Zahn, was included by Zahn under the species aggregate *H. microtum* Boiss., but it does not belong here because of the densely glandular involucre bracts and hairiness of the leaves and stem, as well as the habit. For this reason, we place it in a separate cycle, close to *Gigantella*.

8. *H. chlorochromum* Sosn. and Zahn in Vestn. Tifl. Bot. Sada, 21 (1912) 11; Zahn in Pflzr. IV, 280, 1069.

Perennial. Stem 50–55 cm high, densely covered (particularly at base) with white, divergent hairs 3–5 mm long and stellate pubescence. Basal leaves withering before anthesis; cauline leaves 17–20 (coefficient of leafiness 0.36) gradually decreasing above, more or less crowded (except uppermost leaves), broadly lanceolate, to 12 mm long (4.7:1), tapered toward base or not, sessile, acute, sometimes
 26 with plicate tip, sparsely finely toothed, moderately hairy (12–16) on both sides and along margin, hairs 3 mm long, with abundant (32), stiffish hairs 4 mm long beneath, overall to densely pubescent (the higher the leaves, the fewer the hairs), with occasional stellate hairs and glands, yellowish- or bluish-green, paler beneath; upper leaves linear-lanceolate, merging into bracts, scatteredly stellate-hairy. Inflorescence openly corymbose-panicle, with 6–10 capitula; peduncles sparsely pilose, hairs 2.5 mm long, with occasional glands 0.3–0.4 mm long, greenish-gray from pubescence. Involucre large, 13–14 mm long,

hemispherical, later becoming broader; involucre bracts numerous, irregularly imbricate, lanceolate, broad, subacute, dark green, with pale border; outer bracts narrower, much shorter, loose, all sparsely pilose, hairs 18(13–23), 1 mm long, densely glandular (110), glands 0.2–0.3 mm long, usually without stellate pubescence. Stigmas dark. Similar to broad-leaved *H. umbellatum* L. in habit, but distinguished from it by involucre. Flowering July to August.

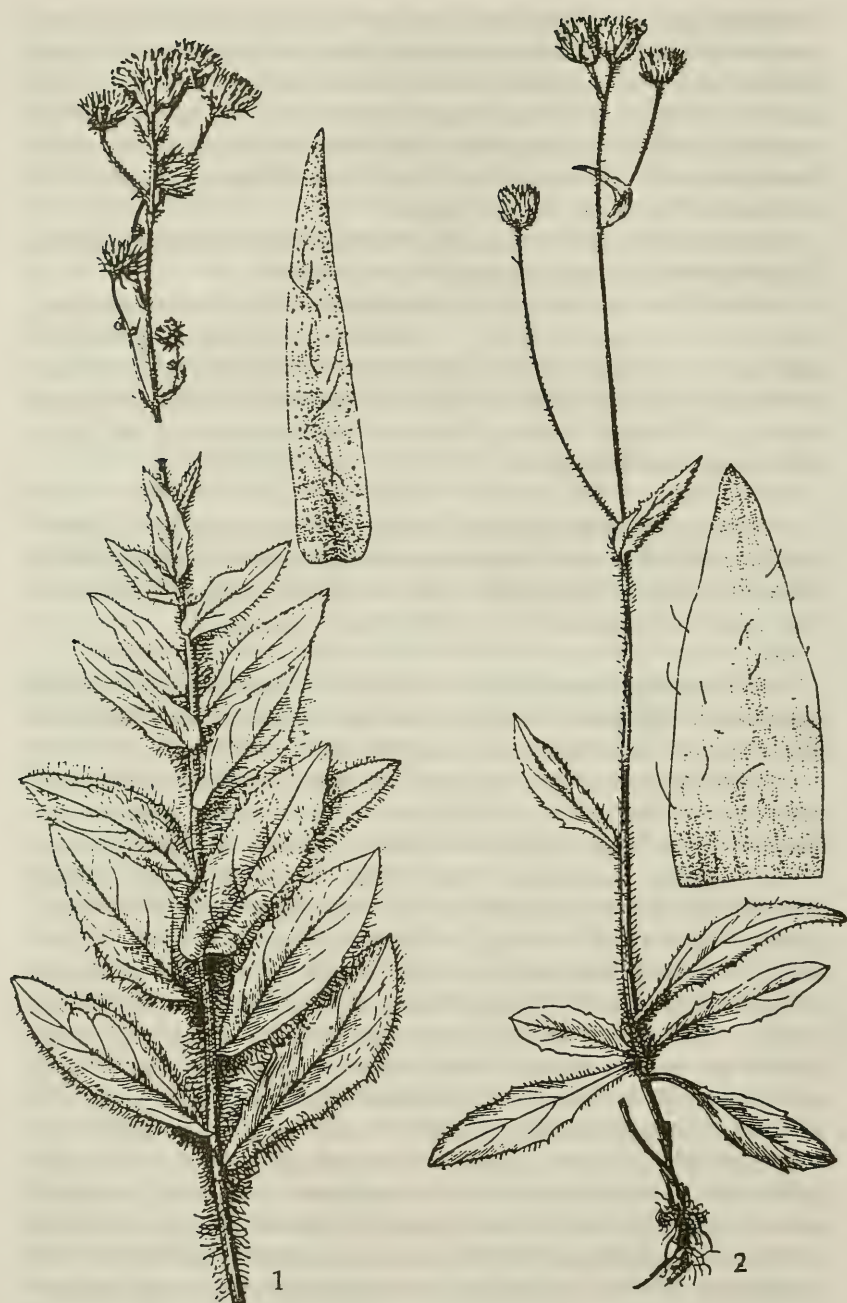
Subalpine pastures.—*Caucasus*: Western Transcaucasia. Endemic. Described from Svanetia (Becho). Type in Tbilisi.

Note. With respect to the pubescence of the involucre bracts, Zahn's (l. c.) diagnosis says: "... involucre ... minute subglandulosa subpilosa," but the specimen collected by D. Sosnovsky from the classic locality and identified by Zahn has densely glandular involucre bracts; in all other respects, however, the characters of the plants conform to the description.

Cycle 3. *Cincinnata* Juxip.—Cauline leaves many (12–33) (coefficient of leafiness 0.40); basal leaves withering before anthesis; inflorescence moderately glandular with very small, yellowish glands 0.2 mm long; leaves broad (3:1), lower densely pubescent.

9. ***H. cincinnatum* Fr.** Epicr. (1862) 131; Zahn in Pflzr. IV, 280, 939; Grossh. Fl. Kavk. IV, 273 (errore *circinnatum*).—*H. akhverdovii* Kem.-Nat. in Dokl. Akad. Nauk ArmSSR, XVI, 2 (1953) 49.

Perennial. Stem 30–60 cm high, 4–7 mm in diameter, angular-sulcate, in lower half (particularly at base) densely covered with retrorse, long (6–7 mm long) light-colored hairs, glabrous above and almost without stellate pubescence. Basal leaves withering before anthesis (exactly like lower cauline leaves, or the latter extremely crowded); cauline leaves 18–33 (average coefficient of leafiness 0.60), broadly ovate- or oblong-lanceolate, to 12 cm long (3:1), lower leaves tapered into semiamplexicaul base, other leaves sessile, with round and almost
 29 cordate semiamplexicaul base; upper leaves more or less ovate, quite distant, all short-acuminate, almost entire or sparsely finely toothed, scatteredly (10, 3–5 mm long) pubescent above, moderately (16, 2–5 mm long) beneath, densely (24–40, 4–5 mm long) along midrib, and scatteredly (10, 2.5–5 mm long) along margins, as a whole up to densely pubescent, without stellate hairs (pubescence considerably reduced toward tip, upper leaves almost glabrous), bluish-dark gray. Inflorescence openly paniculate, with 5–8 capitula; peduncles glabrous or with occasional, short (0.7 mm long) hairs, eglandular, scatteredly stellate-pubescent. Involucre 10–11 mm long; involucre bracts imbricate, obtuse, dark green, with light green border, with occasional or sparse,



11(5–20), dark hairs 1 mm long, moderate to dense 60(44–92) tiny glands 0.1–0.3 mm long, almost without stellate pubescence. Stigmas yellow, later turning brown. Flowering July to September. (Plate II, Fig. 1.)

Slopes and rocky clefts up to 1600 m.—*Caucasus*: Eastern Transcaucasia, Southern Transcaucasia. Endemic. Described from Nakhichevan. Type in Tbilisi; cotype in Leningrad.

Note. Zahn, in his diagnosis (l. c.), says this about the number of glands on the involucre bracts: "... vix vel disperse microglandulosa," but in fact they vary up to dense (see above).

10. **H. virosiforme** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 35; Zahn in Pflzr. IV, 280, 940.

Perennial. Stem branched above; branches densely leafy. Leaves longer than in *H. virosus* with reticulate venation beneath, setose on both sides (but densely along margin), margin of upper leaves sparsely stellate-pubescent. Peduncles glabrous and eglandular but densely stellate-pubescent. Involucre bracts lanceolate, short-acuminate or subobtusate (but not obtuse), dark green with light green border, glabrous, but scatteredly glandular. Stigmas dark. Flowering August to September.

Mountain slopes.—*Caucasus*: ?Southern Transcaucasia. *General distribution*: Asia Minor (former Artvin District). Described from Artvin District (northern Turkey). Type unknown.

Note. Zahn proposes to include here *H. armeniacum* Arv.-Touv. [Cat. (1913) 431] from Armenia.

11. **H. syreistschikovii** Zahn in Izv. Kavk. Muzeya, VII (1912) 140; Zahn in Pflzr. IV, 280, 940.

Perennial. Stem 50–70 cm high, densely covered with long, light-colored setose hairs with bulbous base. Basal leaves withering before anthesis; cauline leaves 12–15 (coefficient of leafiness 0.22), small, grayish-green, throughout very densely and along margin and midrib beneath densely pilose. Inflorescence paniculate, mostly with few capitula; peduncles scatteredly hairy, somewhat stellate-pubescent; involucre 10–11 mm long; involucre bracts green, moderately pubescent (hairs with dark base), with scattered small glands. Stigmas yellow. Flowering August to September.

Caucasus: Eastern Transcaucasia. Endemic. Described from Shusha from Hohenacker's collections. Type unknown.

Cycle 4. Dijnmilea Juxip.—Cauline leaves many (12–35), average coefficient of leafiness 0.40; glands in inflorescence large and small

(0.3–1.2 mm long); leaves narrower (4:1), lower leaves densely or moderately pubescent.

12. **H. chaetothyrsum** Litw. and Zahn in Fedde, Repert. IV (1907) 322; Zahn in Pflzr. IV, 280, 1058.

Perennial. Stem 48–66 cm high, 2–3 mm in diameter, violet and in lower 1/3 sparsely covered with 2 mm long hairs but in upper half with their spiny stubs, without stellate pubescence. Basal leaves, like lower, 5–7; cauline leaves withering before anthesis, 28–35 (coefficient of leafiness 0.56), gradually decreasing in upper part, more or less distant, lanceolate, entire, somewhat undulate or less often sparsely finely toothed, tip sometimes plicate, lower leaves narrowed toward base (somewhat panduriform), with occasional tiny glands along margin, middle leaves with broad base, broader (4.5:1), upper leaves gradually merging with bracteal leaves, glabrous above, with occasional (8–12), short (1 mm long) hairs beneath and along margin, moderately (15, 1.5 mm long) or sparsely pilose (hairs often broken, stubby) beneath along midrib, olive- or grassy-green above, somewhat lustrous, much lighter beneath. Inflorescence openly paniculate, often corymbose at tip, with 7–20 capitula; peduncles quite distinctly pilose with light-colored hairs, hairs 1–2.5 mm long, sparse, 0.4 mm long; glands grayish-pubescent. Involucres 11–12.5 mm long, thick; involucral bracts narrowly lanceolate, obtuse, few-rowed, outer bracts usually dark, inner with narrow green border, bearing few (10, 1.5 mm long) dark hairs with bulbous base and scattered (33, 0.3–1 mm long) glands, usually without stellate hairs. Stigmas initially yellowish, later turning brownish. Flowering July to August.

Mountains to 1400 m.—*Caucasus*: Ciscaucasia. Endemic. Described from Pyatigorsk (Beshtau). Type in Tbilisi; paratype in Leningrad.

13. **H. obscuricaule** Litw. and Zahn in Fedde, Repert. IV (1907) 321; Zahn in Pflzr. IV, 280, 1057.

Perennial. Stem 30–50 cm high, dark- or purple violet, more or less covered with sparse, white-setose hairs with dark bulbous base, but almost glabrous at base, in upper part with sparse, tiny glands, without stellate hairs. Basal leaves withering before anthesis; cauline
 31 leaves 12–20 (coefficient of leafiness 0.40), somewhat crowded, gradually decreasing, lanceolate, lower leaves tapered toward base, sessile, middle leaves slightly tapered, sessile, with round, somewhat amplexicaul base, upper leaves with broad, round, semiamplexicaul base, acuminate, tip often plicate, finely toothed often somewhat undulate, with moderate white stiff hairs on both sides 2–3 mm long,

along margin densely ciliate (1.5–2.5 mm long), sometimes with few flakes, olive-green above, paler beneath. Inflorescence paniculate, with 10 (or more) capitula; peduncles very densely hairy, glandular and stellate-pubescent. Involucres 10–11 mm long, ovate-globose; involucre bracts broad, acute, blackish, outer bracts narrower, inner with green border; all bracts very densely covered with light-colored (with dark base) hairs 1–2 mm long, and glands, outer bracts sparsely stellate-pubescent at base and along margin. Stigmas dark. Flowering July to August.

Herb slopes in subalpine zone.—*Caucasus*: Ciscaucasia. Endemic. Described from Teberda. Type unknown.

Note. According to Zahn, this species is related to *H. chloroprenanthes* Litw. and Zahn with which it grows but is distinguished from it by hairiness (hairs bristly with bulbous base). Apparently, it fits the formula *H. macrolepis* Boiss. > *H. strictissimum* Froel.

14. *H. chloroprenanthes* Litw. and Zahn in Fedde, Repert. IV (1907) 266; Zahn in Pflzr. IV, 280, 1056.

Perennial. Stem to 75 cm high, erect, thick, sulcate, violet at base, moderately hairy (hairs 1–2.5 mm long), somewhat glabrous above base with few tiny glands along entire length and sparsely stellate-pubescent only in upper part, branched; branches with small leaves. Basal leaves withering before anthesis; cauline leaves to 20 (coefficient of leafiness 0.27), gradually decreasing upwards, lanceolate, lower leaves to 15 cm long (10:1), long-tapered toward base, sessile, remaining leaves not so long and less conspicuously tapered toward base, sessile, with broad base somewhat amplexicaul, middle leaves with almost equally broad semiamplexicaul base, sometimes somewhat panduriform, to 2 cm wide, acuminate, glabrous above, sparsely or scatteredly hairy beneath and very densely along midrib, along margin densely hairy (hairs 1–2 mm long) and with delicate tiny glands, olive-green and slightly lustrous above, pale green beneath with inconspicuous reticulate venation, upper leaves reduced to bracts; all leaves usually slightly finely toothed or almost entire without stellate hairs. Inflorescence paniculate; capitula to 25; peduncles sparsely or scatteredly hairy, moderately glandular with large glands and densely tomentose. Involucres 10 mm long, ovate; involucre bracts acuminate or subobtusate; outer bracts considerably shorter, narrow, blackish; inner bracts broader, with broad greenish border, sparsely covered
32 with hairs with dark base, densely glandular and only at base sparsely stellate-pubescent. Stigmas dark. Flowering July to August.

Herb slopes in subalpine zone, together with *H. obscuricaule* Litw. and Zahn.—*Caucasus*: Ciscaucasia. *General distribution*: Balkans-Asia

Minor? Also found in former Artvin District (Armenia Minor). Described from Teberda. Type unknown.

Note. According to Zahn, it is an intermediate (hybrid?) species between *H. macrolepis* Boiss. and *H. prenanthoides* s. l.

15. **H. chaetothyrsoides** Litw. and Zahn in Fedde, Repert. IV (1907) 322; Zahn in Pflzr. IV, 280, 1058.

Perennial. Stem 40–60 cm high, 3 mm in diameter, densely covered (particularly at base), with bristles 2–3 mm long, somewhat stellate-pubescent above. Basal leaves withering before anthesis; cauline leaves 12–16 (coefficient of leafiness 0.27), broadly lanceolate (3.6:1), sessile, semiamplexicaul, to 9 cm long, distinctly finely toothed, olive-green, lower leaves densely (22–28, 1 mm long) hairy on both sides, like midrib beneath (32, 1.5 mm long), moderately (14, 1 mm long) along margin, as a whole densely, but the higher on the stem the less pubescent, upper leaves almost glabrous. Inflorescence openly paniculate with 6 (or more) capitula; peduncles moderately hairy, hairs 2.5 mm long, moderately glandular, with glands 1 mm long, scatteredly stellate-pubescent. Involucres 10.5 mm long, ovate-cylindrical; involucre bracts almost 2-seriate, outer to 5 mm long, inner 10 mm long, broadly lanceolate, subacute, dark (inner with broad light green border), with sparse, 21(20–25), light-colored hairs to 2.5 mm long and moderate, 60(55–67), glands 0.3–1.2 mm long, usually without stellate pubescence. Stigmas dark. Habit similar to *H. bupleurifolium* and involucres similar to *H. macrolepis*. Flowering July to August.

Mountain slopes.—*Caucasus*: Dagestan. Endemic. Described from Dagestan (Dido). Type in Tbilisi; cotype in Leningrad.

Note. An examination of the Ruprecht specimen (cotype) revealed differences from Zahn's diagnosis in the nature of the hairiness of leaves. Description based on available cotype.

Cycle 5. Microta Juxip.—Cauline leaves many (10–32) (average coefficient of foliation 0.35); glands on inflorescence in moderate number; leaves narrowly lanceolate (6:1), sparsely pubescent. Habit resembling narrow-leaved forms of *H. umbellatum* L.

16. **H. panjutinii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 467.

Perennial. Stem 75 cm high to 6 cm in diameter, violet and sparsely
33 pubescent (hairs 1 mm long) at base, glabrous above. Basal leaves withering before anthesis, like lower cauline leaves; cauline leaves 32 (coefficient of leafiness 0.40), lanceolate, lower leaves abruptly narrowed toward base, other leaves with broad, rounded, semiamplexicaul

base, acuminate, with 9–4 acute, fine teeth, to 10 cm long (from 5.5 to 3:1), broader above, with tip often twisted and plicate, almost glabrous above (or with occasional hairs toward margin), with occasional hairs 0.7–1.5 mm long beneath along midrib and margin as a whole sparse. Inflorescence openly paniculate, with 20–25 capitula, often undeveloped; peduncles glabrous, with sparse gland (0.2–0.3 mm long) and stellate hairs. Involucres 10 mm long; involucral bracts lanceolate, acute, light green, glabrous, with scattered, 45(40–50), yellowish glands 0.2–0.3 mm long, without stellate hairs. Achenes 3.5 mm long, reddish-brown. Flowering July to August. (Plate III, Fig. 1.)

In scrubs, in mountains.—*Caucasus*: Western Transcaucasia. Endemic. Described from Abkhazia (Chuberi along Nenskri River). Type in Leningrad.

Note. Close to *H. microtum* Boiss. but distinguished from it by a coefficient of leafiness that is twice as high (twice as many cauline leaves and distinctly toothed leaves).

17. ***H. terekianum*** Litw. and Zahn in Fedde, Repert. IV (1907) 263; Zahn in Pflzr. IV, 280, 1069.

Perennial. Stem 40–50 cm high, somewhat hairy or below middle leaves densely (var. *subpilosum* Litw. and Zahn l.c.), in lower part sparsely, and in upper part densely stellate-pubescent. Basal leaves (as also 2–4 lower leaves) withering before anthesis; cauline leaves 14–22 (coefficient of leafiness 0.40), more or less narrowly lanceolate, to 15 cm long (6–7:1), tapered toward base, finely or short-toothed, on both sides somewhat pubescent, along margin hairy (with hairs 2–4 mm long), all leaves grassy-green and along margin stellate-pubescent but upper leaves only so beneath. Inflorescence openly paniculate, with (5–)8–15 capitula, often undeveloped; peduncles scatteredly hairy, hairs 2.5 mm long, with occasional tiny glands, grayish-tomentose. Involucres to 12 mm long; involucral bracts subobtusate, outer bracts considerably shorter and narrower than inner, slightly loose, all with scattered hairs (1.5 mm long) and moderate number of glands (glands often tiny), sparsely stellate-pubescent at base. Stigmas yellow. Flowering August.

Mountains, at 640–1440 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from Pyatigorsk (Beshtau). Type unknown.

Note. This species was collected together with *H. umbellatum* L., *H. beschtavicum* Litw. and Zahn, and *H. simplicicaule* Somm. and Lev. According to Zahn, it is an ancient hybrid species (of the three species).

18. **H. artvinense** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 34; Zahn in Pflzr. IV, 280, 1069.

- 34 Perennial. Stem 60–70 cm high, violet, thick, densely hispid below, glabrous but somewhat stellate-pubescent above. Basal leaves usually withering before anthesis; cauline leaves to 25 (coefficient of leafiness to 0.36), 10–12 lower leaves crowded, long, lanceolate, acute, sparsely short-toothed, glabrous above, very densely pubescent beneath along midrib with hairs 2–3 mm long, distinctly ciliate (cilia 2 mm long), sparsely stellate-pubescent and somewhat plicate, other leaves gradually decreasing, distant, with broad base, sessile, acute, stellate-pubescent beneath, involute. Inflorescence paniculate, with 10–30 capitula, upper branches clustered, lower distant, not long, obliquely upright; peduncles with many bracteal leaves, without hairs(?) and glands, grayish from stellate pubescence. Involucres 10–12 mm long, truncate at base; involucral bracts lanceolate, subobtusate or subacute, dark green, with broad green border, very densely pubescent, with tiny glands and sparse stellate hairs. Stigmas dark. Achenes yellowish-brown. Flowering July to August.

Montane pine forests.—*Caucasus*: ?Southern Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern part). Described from former Artvin District (eastern Anatolia). Type unknown.

19. **H. foliosissimum** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 31; Zahn in Pflzr. IV, 280, 1024.

Perennial. Stem 55–80 cm high, with occasional hairs at base, glabrous above. Basal leaves usually withering before anthesis; cauline leaves 16–30 (coefficient of leafiness 0.35); more or less narrowly lanceolate (7.5:1), gradually decreasing upward; lower leaves crowded, other leaves distant, upper leaves linear-lanceolate merging with bracteal leaves; all leaves sessile, semiamplexicaul, entire, glabrous above, scatteredly hairy beneath, along margin with conspicuous hairs to 2 mm long, as a whole scatteredly hairy, bluish-green. Inflorescence pyramidal panicle, with 20–50 capitula, a majority of them undeveloped; peduncles slender, glabrous but with occasional, tiny glands 0.2 mm long, grayish-tomentose, with many bracteal leaves. Involucres (7–)8–9 mm long; involucral bracts many-seriate, subobtusate to acute, blackish-green, with greenish border subglabrous, but scatteredly glandular (36) with tiny (0.2–0.3 mm long) glands, almost without stellate hairs. Stigmas dark. In habit resembling *H. chromolepium* but differing in fewer glands and phyllotaxy. Flowering July to August.

Forest glades in coniferous forest.—*Caucasus*: ?Southern Transcaucasia. *General distribution*: Balkans-Asia Minor. Described from former Artvin District. Type in Tbilisi.

Note. Zahn referred this species to the species aggregate *H. sparsum* Friv. (in his interpretation), but based on the number of cauline leaves it does not belong here.

- 35 20. ***H. subartvinense*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 468.

Perennial. Stem 60–70 cm high, 3 mm in diameter, reddish-violet, densely hispid in lower part with hairs 3 mm long, stellate-hairy above. Basal leaves and 3–4 lower cauline leaves withering before anthesis; cauline leaves 20–24 (coefficient of leafiness 0.34), lanceolate, sessile, semiamplexicaul, lower leaves sparsely finely toothed, upper entire, acuminate to 11 cm long (5.5:1), glabrous on both sides, along midrib scatteredly and along margin sparsely pubescent beneath, hairs 1–1.5 mm long (as a whole sparse). Inflorescence paniculate, with 15–25 capitula, upper branches crowded, lower distant, not long; peduncles glabrous and eglandular, grayish-tomentose. Involucres 11 mm long; involucral bracts lanceolate, obtuse, with reddish tip, glabrous, moderately 55(40–70) glandular with well developed glands 0.2–0.5 mm long, usually without stellate hairs. Stigmas dark. In habit similar to *H. laevigatum* Willd. Achenes 3.5 mm long, light reddish-brown. Flowering July to August.

Caucasus: ?Southern Transcaucasia. *General distribution*: Balkans-Asia Minor. Described from former Artvin District (near the Gurdzhan post, collected by J. Woronov). Type in Tbilisi.

Note. The plant was identified by Zahn as *H. artvinense* Woron. and Zahn, but inasmuch as in the diagnosis of this species (Zahn in Pflzr. IV, 280 (1922) 1069) it is said that the: "... involucria ... densiuscule pilosa, parum microglandulosa," we could not leave the present specimen under this name, but described it as a new species, although undoubtedly close to *H. artvinense*. It must be noted that florets contained fertile pollen in abundance.

21. ***H. microtum*** Boiss. Fl. or. III (1875) 873; Zahn in Pflzr. IV, 280, 1069; Grossh. Fl. Kavk. IV, 268.

Perennial. Stem 40–60 cm high, 2–2.5 mm in diameter, erect, glabrous. Both basal and cauline leaves withering before anthesis; cauline leaves 10–14 (average coefficient of leafiness 0.24), lanceolate, to 10 cm long (6:1), sessile, with rounded, semiamplexicaul base, acuminate, upper leaves linear, merging with bracteal leaves, entire, usually glabrous (or with occasional hairs 0.6–1 mm long beneath along margin and midrib). Inflorescence openly paniculate, with distant, short, thin branches, with 9–20 capitula, in part undeveloped; peduncles slender, not pilose, with occasional tiny (0.2–0.3 mm long)

glands, very sparsely stellate-hairy. Involucres 9–10 mm long; involu-
 cral bracts few (almost 3-seriate), lanceolate, obtuse; outer bracts short,
 loose, glabrous or with occasional dark hairs (2–5) 1 mm long,
 36 to scatteredly 38(25–48) glandular with glands 0.3–0.4 mm long, with-
 out stellate hairs. Stigmas black. Achenes purple. Flowering July to
 August.

Mountain pine forests at 1620–1800 m.—*Caucasus*: Dagestan.
General distribution: Asia Minor (eastern). Described from eastern
 Anatolia or from Dagestan? Type in Florence. The plant from Dagestan
 (collected by Ruprecht in Ratlu) is preserved in Leningrad.

Note. In habit, similar to the narrow-leaved forms of *H. umbellatum*
 L., but differs in the nature of the involucre and semiamplexicaul leaves.

Cycle 6. *Pseudoconstricta* Juxip.—Cauline leaves many (15)
 (coefficient of leafiness 0.27); glands on inflorescence very dense;
 involucres 8–9 mm long.

22. ***H. pseudoconstrictum* Zahn** in Fedde, Repert. IV (1907) 323;
 Zahn in Pflzr. IV, 280, 1059.—*H. constrictum* Peter, Beitr. Hier. Osteur.
 Orient. (1898) 31, nec. Arv.-Touv.; Grossh. Fl. Kavk. IV, 267.

Perennial. Stem to 95 cm high, hard, glabrous at base, with scat-
 tered light-colored hairs 1.5 mm long above middle. Basal leaves
 withering before anthesis; cauline leaves many (15?) (coefficient of
 leafiness 0.27?), gradually decreasing, lower leaves oblong-lanceolate,
 winged-petiolate, subacute, sparsely serrate-toothed, middle tapered
 toward base, somewhat panduriform, upper sessile, with broad or cor-
 date, semiamplexicaul base, finely toothed, on both sides scatteredly,
 along margin and midrib very densely pilose beneath with hairs 1–1.5
 mm long. Inflorescence openly paniculate, branched; branches with
 small lanceolate leaves with cordate base; capitula few (?); peduncles
 glabrous but very densely glandular with dark glands, tomentose (flakes
 of hairs and glands often abruptly thinning below). Involucres 8–9 mm
 long, ovate-cylindrical; involucre bracts narrow, subobtuse, dark, with
 narrow greenish border, glabrous, but very densely glandular; stellate
 hairs sparse (?). Stigmas dark. Ligule teeth densely ciliate. Achenes
 yellow. Flowering July to August.

Mountains.—*Caucasus*: Western Transcaucasia. Endemic. De-
 scribed from Svanetia (Latpari Pass). Type in Florence?

Cycle 7. *Leptoprenanthea* Juxip.—Cauline leaves many (12–21)
 (average coefficient of leafiness 0.23); basal leaves usually withered
 (or 1–2); glands on inflorescence dense; leaves somewhat panduriform,
 entire.

23. **H. chromolepium** Zahn in Vestn. Tifl. Bot. Sada, 21 (1912) 8; Zahn in Pflzr. IV, 280, 1024.

- 37 Perennial. Stem 45–80 cm high, 2–3 mm in diameter, violet and sparsely covered at base with hairs 2–3 mm long, glabrous above. Basal leaves 0–2, lanceolate, entire, with long winged petioles, withering before anthesis like (2–3) lower cauline leaves; cauline leaves 12–20 (coefficient of leafiness 0.26), gradually decreasing, lanceolate, lower leaves narrowed to petiole, somewhat panduriform, middle leaves sessile, with swollen or uniformly thickened base, acuminate (5.5:1), upper linear-lanceolate, merging with bracteal leaves; all leaves entire or finely toothed, yellowish- or grayish-green, brighter beneath, glabrous on both sides, along midrib beneath and margin with occasional hairs, without stellate pubescence. Inflorescence paniculate, with 10–30 capitula; peduncles slender, glabrous but with occasional, tiny glands 0.2–0.1 mm long, sparsely stellate-pubescent. Involucres 9–9.5 mm long, later ovate; involucre bracts almost 2-seriate, more or less narrow, subobtusate, blackish-green with broad bright border, (almost) without hairs (0–2) 1 mm long, moderately to densely, 65(40–78) glandular with glands 0.1–0.5 mm long, sparsely stellate-pubescent only at base. Stigmas dark. Achenes straw-yellow. In habit similar to narrow-leaved forms of *H. prenanthoides*. Flowering July to August.

Forest edges and scrubs in mountains.—*Caucasus*: Western Transcaucasia. Endemic. Described from vicinity of Batumi. Type in Tbilisi; cotype in Leningrad.

24. **H. leptoprenanthes** Litw. and Zahn in Fedde, Repert. IV (1907) 324; Zahn in Pflzr. IV, 280, 1067; Grossh. Fl. Kavk. IV, 268.—*H. sublongissimum* Zahn in Fedde, Repert. IV (1907) 325; in Pflzr. IV, 280, 1067.—*H. glareosum* Peter. Beitr. Hier. Osteur. Orient. (1898) 34; nec Serres.— *Ic.*: Zahn in Pflzr. l. c. fig. 75.

Perennial. Stem 60–100(–120) cm high, 2–6 mm in diameter, dark violet in lower third, whole length with scattered, stiff, light-colored hairs 2–3 mm long, upwards with occasional (0–10) glands 0.3 mm long, and sparse stellate hairs. Basal leaves often withering before anthesis like 2–4 lower cauline leaves; cauline leaves 13–21 (average coefficient of leafiness 0.20), distant, lower leaves broadly lanceolate, long-tapered to semiamplexicaul base, to 14 cm long (6:1), middle leaves short-tapered or somewhat panduriform, other leaves with uniformly broad base, semiamplexicaul; all leaves acuminate or acute, almost entire or finely toothed or with 1–3 more or less distinct teeth, light green or slightly bluish-green, paler beneath, glabrous above, with occasional (5–10) hairs 1–1.5 mm long beneath, along midrib moderately hairy with 14(6–22) hairs 1–2 mm long, along margin with occasional (4–10) hairs

1–1.5 mm long, as a whole scatteredly pubescent, sparsely stellate-hairy beneath. Inflorescence openly paniculate, with 3–15(–30) capitula, in part undeveloped; peduncles slender, with occasional hairs 1–2.5 mm long, moderately glandular, glands 0.4 mm long, scatteredly fine-tomentose. Involucres 9–12 mm long, cylindrical-ovate; involucre bracts almost 2-seriate, narrow, obtuse, blackish-green, with light green border, almost without (0–2) (f. *verum* Litw. and Zahn l. c.) or with occasional, 5(3–7), hairs 1–2.5 mm long (f. *pilosiceps* Litw. and Zahn l. c.), scatteredly to moderately glandular 40(40–55), glands 0.8 mm long, sparsely stellate-pubescent. Florets often tubular, somewhat ciliate. Stigmas dark. Achenes light brown or straw-colored. Flowering July to August. (Plate IV.)

Subalpine herb slopes, in montane pine forests to 2300 m.—*Caucasus*: Ciscaucasia, Western Transcaucasia. Described from Tiberda. Type in Tbilisi; paratype in Leningrad.

Note. The specimens preserved in the Herbarium of the Botanical Institute, Academy of Sciences of the USSR, are annotated in part by Zahn and in part by D.I. Litwinov as follows: “*H. leptoprenanthes* ssp. *leptoprenanthoides* Litw. and Zahn.” Inasmuch as a description of the latter subspecies was never published, we are dealing with a “nomen nudum,” and given that the specimens do not differ at all from *H. leptoprenanthes* Litw. and Zahn, we also retain the latter name for our specimens.

Cycle 8. Kirghisea Juxip.—Cauline leaves numerous (27) (coefficient of leafiness 0.22); plants very high (120 cm); basal leaves withering before anthesis; glands on involucre bracts few (15); plants of Central Asia.

25. H. kirghisorum Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 468.

Perennial. Stem to 120 cm high and to 7 mm in diameter, sulcate, pale green, pilose in lower part, glabrous above. Basal leaves withering before anthesis; cauline leaves to 27 (coefficient of leafiness 0.22), broadly lanceolate, sessile, with cordate base, amplexicaul, with reticulate venation beneath, gray, unevenly toothed, to 14 cm long (3:1), glabrous above, with occasional (3–4) hairs 2.5 mm long beneath and along margin, to moderately (14) pilose with hairs 3 mm long along midrib beneath, as a whole sparsely pubescent, without stellate hairs. Inflorescence openly paniculate, branched (branches with small leaves), with 19 capitula, in part undeveloped; peduncles without hairs and glands (or with occasional tiny glands), almost without stellate pubescence. Involucres 10 mm long; involucre bracts lanceolate, broad,

obtuse, almost 2-seriate (outer bracts 3 mm long, inner 10 mm long), glabrous, but with occasional to sparse (12–20), tiny glands 0.1–0.2 mm long, without stellate pubescence. Stigmas yellow. Margins of receptacular pits ciliate-dentate. Flowering August?

Foothills.—*Central Asia*: Tien Shan. Described from Uzgen District. Type in Leningrad.

- 39 **Note.** It is distinguished from all the many-leaved species of section *Pseudostenotheca* by its small number of tiny glands and range; from Central Asian species of this section (*H. alatavicum* Zahn and *H. aryslynense* Zahn) by its much taller growth, large number of cauline leaves, absence of hairs on the involucre bracts and peduncles, and yellow stigmas.

Cycle 9. Litwinowiana Juxip.—Cauline leaves not many (7–12) (coefficient of leafiness 0.30); basal leaves withering before anthesis; all leaves lanceolate, with ovate, semiamplexicaul base, somewhat finely toothed, broad (3:1); involucre 11–14 mm long; glands on peduncles occasional.

26. **H. gothicifrons** Zahn in Izv. Kavk. Muzeya, VII, (1912) 140; Zahn in Engl. Pflzr. IV, 280, 1072.

Perennial. Stem to 30 cm tall, erect, strong, at base somewhat setose, above slightly pilose. Basal leaves withering before anthesis; cauline leaves 10–14 (coefficient of leafiness 0.40), usually not large, to 6 cm long, lowermost leaves crowded, lanceolate, others distant, broadly lanceolate (3:1) from rounded, subamplexicaul base, acuminate, upper leaves ovate, acuminate, quite small, finely toothed, slightly (to sparsely) hairy above, somewhat stellate-pubescent on both sides. Inflorescence dichotomous-paniculate, with (1–)2–4 capitula; peduncles straight, divergent, somewhat hairy and glandular, capitula grayish-tomentose below. Involucre 10–11 mm long; involucre bracts (1.5 mm wide) dark, obtuse, to scatteredly, 30(24–35), pubescent with hairs 1–1.5 mm long, sparsely, 17(10–20), glandular with tiny (0.1 mm long) glands mixed with longer (0.4 mm long) glands, sparsely stellate-hairy. Stigmas dark. Flowering July to August.

Mountain zone.—*Caucasus*: Dagestan. Endemic. Described from Shara-Arguni. Type in Tbilisi.

27. **H. litwinowianum** Zahn in Fedde, Repert. IV (1907) 263; in Pflzr. IV, 280, 1071; Grossh. Fl. Kavk. IV, 269.

Perennial. Stem 30–40 cm high, 2–4 mm in diameter, at base violet, somewhat woody, in lower half and particularly at base scatteredly hairy, with hairs 1–2 mm long (often spiny), stellate-hairy (arachnoid)

throughout, eglandular or with occasional tiny glands. Basal leaves withering before anthesis; cauline leaves 10–12 (coefficient of leafiness 0.30), gradually decreasing upward, lower leaves broadly lanceolate, narrowed toward base, others elliptical or ovate-lanceolate, with ovate, semiamplexicaul base, few-toothed (2–3), green above, paler beneath, lower leaves on both sides scatteredly hispid, with occasional tiny
 40 glands along margin, others glabrous above, scatteredly (12) hairy beneath with hairs 0.7 mm long, along midrib moderately (14) hairy with hairs 1.5 mm long, as a whole to scatteredly pubescent and the higher the leaves, the fewer the hairs, both sides scatteredly (upper leaves densely) stellate-pubescent. Inflorescence very openly paniculate, with 5–15(20) capitula, branches distant, strictly erect; peduncles thick, with occasional hairs 1 mm long and glands 0.3 mm long, grayish-tomentose. Involucres 10.5–14 mm long, ovate; involucre bracts almost 2–3-seriate, lanceolate, subacute, dark green, only inner bracts with greenish border, with scattered 31(26–34) hairs 1.5 mm long, light, stiff, occasional, 12(10–14) glands 0.4 mm long, slightly stellate-hairy. Stigmas dark. Flowering July to August.

Roadsides, in mountains to 2300 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Teberda. Type in Tbilisi; cotype in Leningrad.

Note. There are differences between the description to Zahn (l. c.) and the cotype (provided with his handwritten description): in the diagnosis the size of the involucres is given as 12–14 mm, whereas on the specimen their length is 10.5 mm; the arrangement of the involucre bracts is described as regularly imbricate, whereas the few-rowed arrangement of the bracts, typical of the section is clearly visible on the specimen; according to Zahn, the involucre bracts are quite densely stellate-hairy, but in fact they are very sparsely (and only at the base) pubescent; the peduncles are said to be without glands, whereas glands are present, although their number is very small.

28. *H. ermaniense* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 469.

Perennial. Stem 30–45 cm high, 1.5–2.5 mm in diameter, violet at base, short-pubescent (hairs 1 mm long) (at first glance almost glabrous). Basal leaves withering before anthesis; cauline leaves 9–11 (coefficient of leafiness 0.27), lanceolate, short-tapered toward base, middle and upper leaves cuneate or round at base, with 3–7 acute teeth (more or less large and small teeth together), up to 9 cm long (3.4:1), glabrous above, beneath and along margin occasional few (5–9), short (1 mm long) hairs, stellate-hairy on both sides, midrib prominent beneath. Inflorescence openly paniculate, with 2–7 capitula; peduncles

slender, with occasional hairs 1 mm long and glands, scatteredly stellate-hairy. Involucres 10.5 mm long; involucral bracts obtuse, glabrous, with scattered (33) glands, almost without stellate hairs. Stigmas greenish-yellow. Flowering August.

Subalpine zone at 2300 m, in birch groves.—*Caucasus*: Western Transcaucasia. Endemic. Described from Southern Osetia (Ermani). Type in Leningrad.

Note. It is distinguished from *H. litwinowianum* Zahn, which has a similar habit, by the absence of hairs on the involucral bracts and the greenish-yellow stigma.

- 41 29. ***H. sulphurellum*** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 22; Zahn in Pflzr. IV, 280, 1071.

Perennial. Stem 35–45 cm high, 2 mm in diameter, with scattered stiff, white, hairs 1–2.5 mm long, or scabrous from spines, somewhat stellate-pubescent and with occasional tiny glands in upper part. Basal leaves withering before anthesis; cauline leaves 7–10(–12) (coefficient of leafiness 0.25), lanceolate (3.3:1), lowermost leaf narrowed broadly winged petiole, mostly dried, lower leaves with tapered base, subamplexicaul, almost entire, short-toothed, middle leaves with tapered base, sessile, often more conspicuously toothed, upper leaves distant, with ovate base, acuminate, sparsely stellate-hairy beneath, almost glabrous above, scatteredly (10), pubescent beneath with hairs 1.2 mm long, along midrib (14), with hairs 1.2 mm long, along margin with occasional (4) hairs 1 mm long; as a whole scatteredly pubescent. Inflorescence dichotomous-paniculate, with 2–8(–12) capitula, often undeveloped; peduncles with scattered, stiff, hairs 1–2.5 mm long and occasional glands 0.3 mm long, scatteredly stellate-hairy. Involucres 10–12.5 mm long; involucral bracts lanceolate, obtuse or subacute, with sparse (20) hairs 1.2 mm long and scattered (28) glands 0.2–0.4 mm long, at base and along margin somewhat stellate-hairy. Florets sulfur-yellow. Stigmas dark. Flowering July to August.

Foothills.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Bakuriani. Type in Tbilisi.

30. ***H. sulphurelliforme*** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 23; Zahn in Pflzr. IV, 280, 1072.

Perennial. Stem 40–50 cm high, almost glabrous. Basal leaves (almost) withered before anthesis; cauline leaves 6–8 (coefficient of leafiness 0.16), distant, gradually decreasing upward, lower leaves broadly lanceolate, with broad winged petiole, semiamplexicaul, middle leaves sessile, semiamplexicaul, with slightly tapered base, upper leaves with ovate base, acuminate, almost entire or somewhat finely toothed;

all leaves with occasional, stiff, short hairs or without them. Inflorescence paniculate, with 4–7 capitula; peduncles scabrous from scattered, mostly spiny, less often developed hairs, scatteredly glandular, densely stellate-hairy. Involucres 10–11 mm long; involucre bracts lanceolate, somewhat obtuse or subacute, with greenish border, with occasional hairs and glands, sometimes tiny, at base and along margin narrowly stellate-hairy. Florets often tubular. Stigmas dark. Flowering July to August.

Mountain zone.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Bakuriani. Type not known.

Note. The plants are similar to *H. sulphurellum* but distinguished by a considerably lower coefficient of leafiness, sparser pubescence on all parts (hairs shorter and often spiny), and short involucres.

Cycle 10. *Caucasiensia* Juxip.—Cauline leaves not many (8–15) (coefficient of leafiness 0.27); basal leaves 0–2 at anthesis; leaves tapered toward base, lanceolate, broad (3.5:1), distinctly and sharply 5–8 serrate-toothed; involucres 9–10 mm long; glands on peduncles numerous.

31. ***H. caucasiense* Arv.-Touv.** (emend. Zahn) in Acta horti Tiflis. IV (1899) 375, ex Litw. in Schedae HFR VII, 27 and fasc. XLII (1911) No. 2067; Zahn in Pflzr. IV, 280 1063.—*H. biebersteinii* Litw. and Zahn ssp. *pulchrisetum* Litw. and Zahn in Fedde, Repert. IV (1907) 262.—“*H. caucasicum* Arv.-Touv.” (erroneo pro “*H. caucasiense*”) Zahn l. c. (non Fr.; nec N. P.).—*H. gmelinianum* Arv.-Touv. Catalog. (1913) 92 (cum descr. sub *Hispidis*).—*H. hispidum* Fr. Symb. (1848) 168.—*H. caucasicum* Fr. in Acta Upsal. XIII, 406 ex Fr. l. c. 48; Grossh. Fl. Kavk. IV, 276.—**Exs.:** GRF No. 2067.

Perennial. Stem 20–60 cm high, in lower half scatteredly covered with white stiff hairs 3.5–5 mm long, above with occasional, in inflorescence sometimes with tiny (0.1 mm long) glands and somewhat stellate-hairy. Basal leaves withering before anthesis or 1–2, lanceolate, imbricate, finely toothed cauline leaves 8–15 (coefficient of leafiness 0.27), more or less uniformly spaced, broadly or elliptically lanceolate, to 15 cm long (4:1), lower leaves narrowed to almost short winged petiole, middle leaves semiamplexicaul from broad base, somewhat tapered but later broadening, lanceolate, acuminate, sessile; all leaves 5–8-toothed with triangular-lanceolate to sharply serrate, teeth sparsely (6–8) hairy on both sides, above with bristles 4 mm long, and beneath 1.5–2 mm long, softer, along midrib beneath moderate (10–18), 1.5–2 mm long, along margin sparse to scattered (4–7) hairs, as a whole to scattered, setose-ciliate, bluish-gray above, paler beneath.

Inflorescence paniculate, with (2-)5-15(-25) capitula; peduncles dark green, with occasional hairs 1 mm long, but very dense glands 0.2 mm long, scatteredly stellate-hairy. Involucres 9-10.5 mm long, cylindrical-ovate, later truncate; involucre bracts 2-3-seriate, narrow, subacute with sparse, 21(18-28), hairs 1-1.5 mm long and scattered, 33(24-40), glands 0.4 mm long, very sparsely stellate-hairy. Stigmas yellow. Receptacular alveoli with long-ciliate margin. Flowering July to August. (Plate V.)

On rocks in mountains, at 900-1200 m.—*Caucasus*: Ciscaucasia. Endemic. Described from Pyatigorsk (Beshtau). Type in Tbilisi.

- 43 **Note.** Zahn referred this species to *H. muricellum* Fr. (sp. coll.) from which it differs in the coefficient of leafiness and abundance of glands on the peduncles.

Cycle 11. *Muricella* Juxip.—Cauline leaves not many (3-15) (coefficient of leafiness 0.20). Basal leaves withering before anthesis or to 2; involucre bracts both with hairs and glands; leaves lanceolate, not panduriform.

We have combined the species placed by Zahn between species aggregates *H. muricellum* Fr. and *H. callichlorum* Litw. and Zahn. In Zahn's opinion *H. muricellum* Fr. is a transitional species linking *H. sparsum* Friv. with *H. laevigatum* Willd.; but *H. callichlorum* must be a combination of *H. sparsum* Friv. and *H. laevigatum* Willd. (or *H. umbellatum* L.)—*H. vulgatum* Fr. Such an effort to interpret the phylogeny of the species is of great theoretical interest; however, in practice it is, unfortunately, difficult, if not impossible, to draw a convincing boundary between them. Such a possibility was hindered to a considerable extent because of the almost total absence of reliable herbarium material for this cycle.

Note. On the basis of material collected from Transcaucasia by Hohenacker (from Tsum in Podgoruon?) and Wilhelms (in Georgia), Fries described the species under the name *H. muricellum* Fr. [Epicr. (1862) 117] and provided the following description: "Stem slender, leafy, without basal leaves, strongly branched, branches with subtending leaves, uncapitulate (lower branches and capitula undeveloped), terminal peduncles single- or few-capitulate, with bracteal leaves. Plant green, entirely covered with short, stiff, white, inclined bristles. Leaves lanceolate, sessile, with 1-2 teeth on each side, lower leaves withering. Involucres almost uniseriate; outer involucre bracts fewer, covered with soft white bristles in single row (because of which the involucre appears acuminate), inner bracts obtuse. Stigmas yellow."

Since the description did not mention plant height, number of cauline leaves, number of capitula, or length of involucre, and also said

nothing about glands or stellate hairs, at the most what can be said on the basis of such a description is that the plant apparently belongs to Section *Tridentata*, as also concluded by the author of the species. But as authentic material was at the disposal of Fries, the unique structure of the involucre bracts and the nature of the inflorescence could not have escaped his notice, and he included in his description this note: "... involucre ab hac stirpe admodum ad *Pseudostenotheca* recedit."

Zahn did not see the authentic specimens, could not finally verify the description of the author of the species, and on the basis of Fries' note included the description in his monograph (Pflzr. IV, 280 (1922) 1063), but then used this name (apparently as the oldest) for naming his species aggregate—*H. muricellum* (l. c. 1062), wrongly citing it as *H. muricellum* Fr. (Epicr. 117) (correctly, it should be *H. muricellum* Zahn). In Zahn's species aggregate he also included the Caucasian species: *H. caucasiense* Arv.-Touv., *H. biebersteinii* Litw. and Zahn, *H. hypopogon* Litw. and Zahn, and *H. acutangulum* Kozl. and Zahn, which we have, in part, related to other cycles.

A.A. Grossheim (*Fl. Kavk.* IV, 267) throughout used the abridged description of Zahn's species aggregate, which must be borne in mind when consulting his works.

32. ***H. rigidellum*** Litw. and Zahn in Fedde, Repert. IV (1907) 265; Zahn in Pflzr. IV, 280 (1922) 1066.

Perennial. Stem up to 50 cm high, thick, sulcate, at base blackish-purple and moderately hairy with white hairs, hairs considerably decreasing above, sparsely stellate-hairy. When present, basal leaves at anthesis petiolate, ovate, sparsely crenate-toothed, but then cauline leaves 3–4, quite distant (var. *β. phyllopodium* Litw. and Zahn), or basal leaves almost absent and then cauline leaves 7–12 (coefficient of leafiness about 0.25); moreover 3–4 lower leaves somewhat crowded but remaining leaves quite distant; lower leaves elliptical or broadly lanceolate, quite large (to 18 cm long), subacute, often plicate, tapered to winged petiole (4.5–5:1), others gradually decreasing, short-petiolate or sessile, tapered at base, finely toothed or on both sides with 2–4 triangular or lanceolate, large (to 10 mm long) teeth, or at base dissected-toothed, upper leaves narrowly lanceolate, finely toothed; all leaves on both sides or only beneath very sparsely (or occasionally) covered with very short hairs, along midrib beneath and at base somewhat more densely hairy, margin scabrous from spines, sparsely pilose, along midrib beneath, scatteredly finely glandular, grayish-tomentose. Involucres pale. Inflorescence lax panicle, with 12–30 capitula; peduncles sparsely pilose, scatteredly finely glandular,



grayish-tomentose; involucre 9–10 mm long, ovate; involucre bracts subobtusate, inner bracts with green border, scatteredly or moderately pilose with short hairs (hairs white, with black base, 1 mm long), scatteredly glandular and stellate-hairy. Stigmas dark. Flowering July to August.

Mountains.—*Caucasus*: Ciscaucasia. Endemic. Described from Pyatigorsk (Beshtau). Type unknown.

- 47 33. **H. callichlorum** Litw. and Zahn in Fedde, Repert. IV (1907) 264; Zahn in Pflzr. IV, 280, 1065; Grossh. Fl. Kavk. IV, 268.

Perennial. Stem 30–40 cm high, slender, erect, at base violet, scabrous from short, stiff, sparse hairs, stellate-pubescent almost throughout. Basal leaves usually withered before anthesis; cauline leaves 7–10 (coefficient of leafiness 0.24), distant, gradually decreasing upward, lower leaves quite small, lanceolate-oblong, obtuse or somewhat spatulate, narrowed to short winged petiole, on both sides covered with short (1 mm long) hairs, remaining leaves narrower, longer, lanceolate or narrowly lanceolate, tapered toward base, sessile, acuminate, glabrous above, scatteredly pilose beneath or only along midrib and margin moderately pilose (along margin often densely hairy and scabrous from spines), upper leaves linear-lanceolate, stellate-pubescent only beneath; all leaves light green, usually fine-toothed or short-toothed. Inflorescence openly paniculate, with 3–8 capitula; peduncles with few hairs, eglandular, greenish-gray from scattered stellate hairs. Involucre 10 mm long, hemispherical, later truncate; involucre bracts irregularly imbricate, outer bracts considerably shorter, narrower, loose, blackish, others subobtusate, dark green, with light-colored border, and scattered, short hairs 1 mm long outside, with occasional tiny glands and only at base sparsely stellate-hairy. Stigmas yellow, later turning brown. Flowering July to August.

On exposed rocks to 2300 m.—*Caucasus*: Ciscaucasia. Endemic. Described from Teberda. Type unknown.

34. **H. beschtaevicum** Litw. and Zahn in Fedde, Repert. IV (1907) 246; Zahn in Pflzr. IV, 280, 1029.

Perennial. Stem 25–45 cm high, reddish and very sparsely pubescent at base, almost glabrous above, sulcate, in upper part sparsely stellate-hairy. Basal leaves rarely persisting (1–2) to anthesis, lanceolate-spatulate, obtuse; cauline leaves (6–)8–10 (coefficient of leafiness 0.23), sometimes lower 3–5 cauline leaves clustered, or all distant, lanceolate, narrowed to winged petiole, semiamplexicaul, acute, finely or coarsely toothed with lanceolate teeth right up to petiole, stramineous yellowish-green and almost glabrous above (or only lower

leaves sparsely pubescent), paler beneath and with hairs 2–3 mm long, but moderately pilose along midrib, margin and petiole, with occasional tiny glands along margin and winged petiole, middle leaves narrowly lanceolate sessile, with tapered base, almost entire, slightly stellate-hairy beneath. Inflorescence openly paniculate, often branched, with (5–)25–40 capitula, in part undeveloped; peduncles slender, glabrous, without or with occasional tiny glands and with very dense pubescence abruptly disappearing below, with 2–3 bracteal leaves. Involucres 9.5 mm long, cylindrical-ovate, later with truncate base; involucre bracts in few rows, narrow, acute or subacute, dark outside with pale green border, sparsely pubescent with dark hairs 1 mm long and sparse glands, base and margin densely stellate-pubescent. Florets tubular; stigmas dark, included. Flowering July to August.

Forest zone in mountains up to about 850 m.—*Caucasus*: Ciscaucasia. Described from Pyatigorsk (Beshtau). Type unknown.

Note. According to Zahn (l. c.), this species is perhaps a link between *H. simplicicaule* Somm. and Lev. (from cycle *Sparsa*) and *H. biebersteinii* Litw. and Zahn (from cycle *Muricella*).

35. *H. tzagwerianum* Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 21; Zahn in Pflzr. IV, 280, 1066.

Perennial. Stem up to 70 cm high, slender, at base violet and moderately hairy with soft and white hairs 1.5–2.5 mm long, above without hairs, in upper part densely stellate-pubescent. Basal leaves mostly withering before anthesis; cauline leaves 12–15 (coefficient of leafiness 0.20), gradually decreasing upward, lower leaves oblong- or broadly lanceolate, acuminate, narrowed to broadly winged petiole, others lanceolate, sessile, tapered toward base, upper leaves narrower, short-acuminate, sometimes acuminate from ovate base; all leaves irregularly toothed with short and long teeth (2–4 teeth on each side), green and glabrous above, sparsely pubescent beneath and along margin or along margin moderately hairy (hairs 0.5–2 mm long), grayish-green beneath, on both sides stellate-hairy (more densely beneath). Inflorescence paniculate, with fewer capitula; peduncles sparsely hairy, sparsely (?) glandular, grayish-tomentose. Involucres 9–10 mm long, ovate; involucre bracts narrowly lanceolate, acute, moderately hairy, sparsely glandular, stellate-pubescent along margin and to tip. Stigmas yellowish-brown, later turning dark. Flowering July to August.

Caucasus: Eastern Transcaucasia. Endemic. Described from Tsagveri (Gori District). Type unknown.

Note. According to Zahn, it is an intermediate species between *H. laevigatum* Willd. and *H. erythrocarpum* Peter.

36. **H. acutangulum** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 20; Zahn in Pflzr. IV, 280, 1065.

Perennial. Stem to 60 cm high, moderately hairy below and with stellate hairs, sparsely hairy and grayish-tomentose above. Basal leaves withered before anthesis; cauline leaves to 12 (coefficient of leafiness 0.20), lanceolate, lower leaves somewhat crowded, quite broadly winged-petiolate, other leaves quite distant, conspicuously smaller, sessile, with tapered base, subacute, unevenly toothed, broadly triangular, mostly glabrous (or with occasional hairs along margin) above, but slightly stellate-pubescent, with very short, simple and dense stellate hairs beneath, along margin very densely pilose, stramineous or yellowish-green. Inflorescence paniculate, branched, lower branches quite distant, erect (at acute angle to stem), with 12–40 capitula; peduncles in upper part hairy, sparsely glandular, grayish-tomentose. Involucres 8–9 mm long; involucre bracts in few rows; outer loose, subacute, dark green, with greenish border, moderately hairy, hairs light-colored with dark base, somewhat glandular (partly with tiny glands) and only at base sparsely stellate-hairy. Stigmas initially yellowish, later dark. Flowering July to August.

Caucasus: Eastern Transcaucasia. Endemic. Described from Bakuriani. Type unknown.

37. **H. kochtanum** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 24 (1913) 22; Zahn in Pflzr. IV, 280, 1066.

Perennial. Stem to 35 cm high, slender, at base dark violet and densely pilose, only slightly pilose above, densely stellate-hairy. Basal leaves usually persisting at anthesis, oblong-lanceolate, narrowed to short petiole, finely toothed or 2–4 serrately toothed, more or less acute; cauline leaves 5–6 (coefficient of leafiness 0.16), distant; oblong-lanceolate, short-petiolate, upper leaves lanceolate, sessile, with cuneate base, finely toothed or 2–4 serrately toothed; all leaves pubescent above, along margin and beneath more or less densely, along petioles densely pubescent, stellate-hairy on both sides (upper leaves very densely), light green. Inflorescence paniculate, with 3–15 capitula, partly undeveloped; peduncles pubescent with light-colored hairs with dark base, somewhat glandular (mainly below capitula), white-tomentose. Involucres 9–10 mm long; involucre bracts lanceolate, subacute, dark green, quite densely hairy with light-colored hairs, sparsely glandular with tiny glands, moderately stellate-hairy along margin. Stigmas dark. Flowering July to August.

Mountains.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Bakuriani (Kokhta Mountain). Type unknown.

Note. This species is similar to the few-leaved *H. laevigatum* Willd.

38. **H. biebersteinii** Litw. and Zahn in Fedde, Repert. IV (1907) 260; Zahn in Pflzr. IV, 280, 1063.—**Exs.:** Zahn, Hier, Europ. No. 399.

Perennial. Stem 45–55 cm high, to 2 mm in diameter, erect, sulcate, at base slightly violet and hairy with occasional hairs 3–4 mm long, glabrous above, eglandular and sparsely stellate-hairy above. Basal leaves mostly withering before anthesis, pubescent (0–2), lanceolate, narrowed to winged petiole, to 16 cm long (8:1), acute, with 3 long, triangular, and often incurved teeth; cauline leaves 6–10 (coefficient
50 of leafiness 0.16), distant, gradually decreasing upward, lanceolate, lower leaves narrowed petiole, others sessile, quite narrow (7:1), with tapered base, acuminate or acute, with 3–5 straight and incurved large and small (5–1 mm long) teeth, glabrous above, with solitary hairs along margin and beneath, with occasional tiny glands along margin, upper leaves paler and stellate-hairy beneath, olive-green above. Inflorescence paniculate, with 3–20 capitula; peduncles with occasional hairs 1.5–2.5 mm long and occasional glands 0.3 mm long, scatteredly stellate-hairy. Involucres 10 mm long, ovate; involucre bracts 3-seriate, acuminate, outer much shorter and narrower than inner, scatteredly, 28(26–30), pubescent hairs 1 mm long, to sparsely, 15(12–18) glandular, glands 0.2–0.3 mm long and sparsely stellate-pubescent. Flowers tubular; stigmas dark, not exerted. Flowering July to August (Plate VI.)

Subalpine meadows at 2300–2600 m.—*Caucasus*: Ciscaucasia. Endemic. Described from Teberda. Type in Tbilisi.

Note. In habit it resembles the few-leaved *H. laevigatum* Willd. but is distinguished by the involucres and their pubescence.

39. **H. hypopogon** Litw. and Zahn in Fedde, Repert. IV (1907) 261; Zahn in Pflzr. IV, 280, 1064.

Perennial. Stem 50–90 cm high, 1.5–2.5 mm in diameter, in lower part quite densely covered with soft, white hairs 3–5 mm long, above somewhat pilose, in inflorescence very sparsely stellate-pubescent. Basal leaves withering before anthesis; cauline leaves 6–12 (coefficient of leafiness 0.13), gradually decreasing upward, lanceolate, acute, short-toothed, lower leaves narrowed to very long, broadly winged, densely hairy petiole, to 18 cm long (7:1), other leaves more or less sessile, glabrous above, sparsely pubescent beneath, along midrib and margin moderately pubescent, without stellate pubescence, or upper leaves somewhat stellate-pubescent beneath (f. *subtridentatum* Zahn, l. c.) with occasional glands along margin, bluish-green. Inflorescence openly paniculate (often to 1/3 length of stalk), with 4–40 capitula; peduncles very sparsely (singly) hairy, scattered glandular, sparsely stellate-pubescent. Involucres 10 mm long, cylindrical-ovate; involucre bracts

2–3-seriate; outer bracts considerably shorter than inner, dark or blackish, inner bracts pale or with pale border, acute or subacute, sparsely to scatteredly pubescent, moderately glandular with tiny (yellowish) glands, almost without stellate pubescence. Stigmas dark or blackish. Achenes light-brown, to 4 mm long. Flowering July to August.

Forests in mountains to 1300 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Teberda. Type unknown.

Note. The plants are similar to *H. vulgatum* Fr. s. l. or to *H. laevigatum* Willd. s. l. but are distinguished from both species by their involucre.

- 51 *Cycle 12. Medschedsa* Juxip.—Cauline leaves not many (8–12) (coefficient of leafiness 0.15); basal leaves 0–2 at anthesis; involucre bracts with occasionally glands, but glabrous (or very rarely with sparse hairs); leaves lanceolate or somewhat panduriform.

40. *H. chlorophilum* Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 20; Zahn in Pflzr. IV, 280, 1060.

Perennial. Stem to 70 cm high, thick, green, maculate, dark purple and slightly pubescent below, glabrous, somewhat stellate-hairy above. Basal leaves withered before anthesis or few; cauline leaves 10–12 (coefficient of leafiness 0.15), distant, gradually decreasing upward, lower leaves large (to 16 cm long), elliptical or oblong-lanceolate (4:1), sessile, with tapered subamplexicaul base, acuminate; middle leaves somewhat panduriform, sessile, with tapered or almost uniformly broad base; upper leaves sessile, lanceolate, narrower, irregularly toothed, glabrous above, scatteredly pilose beneath, along midrib moderately pilose, hairs 1.0–1.5 mm long, without stellate hairs (only upper leaves sparsely pubescent beneath), olive-green and slightly lustrous above, pale green beneath. Inflorescence paniculate with few capitula, branched; branches with small bracts; peduncles glabrous or moderately glandular with tiny glands, grayish-tomentose. Involucre 8–9 mm long, cylindrical-ovate; involucre bracts obtuse, dark, with green border, sparsely hairy, but quite densely short-glandular, densely stellate-hairy (grayish-green). Florets partly tubular; corolla teeth short-ciliate; stigmas dark. Achenes straw-brown. In habit similar to *H. medschedsensis* Zahn. Flowering July to August.

Mountains.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Bakuriani. Type unknown.

Note. It is distinguished from the former species by a much taller stem, toothed leaves, and sparse pubescence, but less glandular and densely stellate-pubescent involucre bracts.

41. **H. medschedsense** Zahn in Fedde, Repert. IV (1907) 323; Zahn in Pflzr. IV, 280, 1059.

Perennial. Stem to 60 cm high, thick, quite densely pubescent. Basal leaves withered at anthesis or fewer; cauline leaves 8–10 (coefficient of leafiness 0.15) oblong or broadly lanceolate (4.5:1), lower leaves large (to 20 cm long), winged-petiolate, semiamplexicaul, subsequent leaves abruptly narrowed from short-winged quite broad base, remaining leaves with narrow base, sessile, amplexicaul, sometimes auriculate; all leaves sparsely finely toothed, glabrous above, densely ciliate along margin and midrib beneath, cilia 1 mm long, olive-green. Inflorescence openly paniculate, with obliquely divergent branches, 52 with 20 (or more) capitula; peduncles slender, without hairs, moderately glandular and also stellate-hairy. Involucres 9 mm long, ovoid-cylindrical; involucre bracts more or less obtuse, dark, inner bracts with broad pale green border, glabrous, moderately glandular and stellate-pubescent. Stigmas black; corolla teeth slightly ciliate. Achenes straw-yellow. Flowering July to August.

Mountains.—*Caucasus*: Dagestan. Endemic. Described from Dagestan (Medshedze Mountain). Type unknown.

42. **H. niphocladum** Schelk. and Zahn. in Izv. Kavk. Muzeya, VII (1912) 138; Zahn in Pflzr. IV, 280, 1034.

Perennial. Stem 60–70 cm high at base (sparsely) pubescent with hairs 2–3 mm long, almost glabrous above but stellate-hairy and slightly glandular. Basal leaves 1–3, quite large (to 16 cm long), broad (5.6:1), ovate- or oblong-lanceolate, more or less gradually narrowed to winged petiole with broad sheath, subacute, above with occasional hairs 1–1.5 mm long, beneath scattered, along margin, midrib, and petioles quite dense, sharply finely toothed, bluish-green; cauline leaves 8–12 (coefficient of leafiness 0.15), considerably smaller than basal leaves, lower leaves with tapered, semiamplexicaul base, middle leaves sessile, upper merging with small lanceolate bracts, almost without stellate hairs. Inflorescence paniculate, with 18–30 capitula; peduncles slightly hairy, sparsely glandular, white-tomentose. Involucres 10–11 mm long; involucre bracts narrowly lanceolate, obtuse; outer bracts with narrow greenish border, inner with broad greenish border, glabrous, moderately 56(40–70) glandular with glands 0.4–1 mm long, basally slightly stellate-hairy. Stigmas dark. Flowering July to August.

Alpine meadows at 2400–2500 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Svanetia. Type in Tbilisi.

Note. According to Zahn, this species is intermediate between *H. simplicicaule* Somm. and Lev. and *H. erythrocarpum* Peter.

Cycle 13. Tschamkoriya Juxip.—Cauline leaves not many (2–12) (coefficient of leafiness 0.16); basal leaves 0–2(5) at anthesis. Involucral bracts with hairs and glands, latter sparse to scattered (30); involucre 9–10 mm long.

43. **H. alatavicum** Zahn in Pflzr. IV, 280 (1922) 1047.

Perennial. Stem to 40 cm high, almost glabrous above or pubescence sparse to scattered together with slightly stellate-hairy. Basal leaves to 4, oblong, narrowed to petiole, obtuse, short-toothed, slightly pilose above; cauline leaves 5–8 (coefficient of leafiness 0.20), distant, gradually decreasing, oblong or elliptical-lanceolate, slightly tapered toward base, short-acuminate, often short-toothed, upper leaves narrower, long-acuminate. Inflorescence paniculate, with 5–10(20) capitula, in part undeveloped; peduncles slender, scatteredly hairy, eglandular, densely tomentose. Involucres 9–10 mm long; involucral bracts lanceolate, obtuse, scatteredly pilose, more or less sparsely glandular, somewhat stellate-hairy (at base). Stigmas dark. Flowering July to August.

Mountains.—*Central Asia*: Dzhungaria-Tarbagatai. Described from Alatau (between Baskan and Sarkan rivers). Type unknown.

Note. The description is based on Zahn's extremely incomplete diagnosis.

44. **H. acroxanthum** Sosn. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 19; Zahn in Pflzr. IV, 280, 1047.

Perennial. Stem 15–35 cm high, slender, bent, slightly hairy (more distinctly so at dark-violet base), quite densely stellate-hairy above. Basal leaves lanceolate, to 8 cm long (6:1), tapering into short, broadly winged petiole or more or less sessile, short-toothed, glabrous above, along margin moderately setose-ciliate, beneath, particularly along midrib quite densely hairy with soft, white hairs 2–3.5 mm long, bluish-green above, dull green beneath; cauline leaves 3–6 (coefficient of leafiness 0.18), abruptly decreasing upward, distant, lanceolate, acute, upper leaves linear-lanceolate or linear, merging with bracteal leaves, slightly stellate-hairy beneath. Inflorescence openly paniculate, with 3–15(20) capitula; peduncles long, green, sparsely pilose, slightly glandular, more or less scatteredly stellate-hairy. Involucres 8–9 mm long; involucral bracts almost 2-seriate, outer short, narrow, remaining bracts linear-lanceolate, subacute, dark, moderately pubescent with sparse tiny glands and (only at base more or less dense) stellate-hairy. Stigmas yellow (later turning brown). Flowering July to August.

Mountain slopes.—*Caucasus*: Western Transcaucasia. Endemic. Described from Tuapse District (Dva Brata Mountain). Type unknown.

45. **H. bakurianense** Fom. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 33; Zahn in Pflzr. IV, 280, 1048.

Perennial. Stem to 40 cm high, slender, at base violet, covered with stiff white hairs, with short hairs above and densely stellate-hairy. Basal leaves absent or few, broadly lanceolate, narrowed to short winged petiole, acuminate, finely and thinly toothed, somewhat reddish; cauline leaves to 7 (coefficient of leafiness 0.18), lower broadly lanceolate, short-petiolate, short-serrate; remaining leaves smaller and narrower, sessile; petiole tapering toward base, upper leaves merging with linear bracteal leaves, almost glabrous above (or hairs along sides and margin), quite densely hairy beneath along petiole, somewhat stellate-hairy beneath or on both sides. Inflorescence paniculate, with 4–75 capitula, in part undeveloped; peduncles slightly hairy, usually eglandular, grayish-tomentose. Involucres 10–11 mm long, cylindrical-ovate; involucre bracts lanceolate, acute, few-rowed, outer narrow, scatteredly stellate-hairy along margin, inner broader, scatteredly hairy, more or less eglandular. Stigmas dark. Flowering July to August.

Mountain forests.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Bakuriani. Type unknown.

46. **H. diaphanoidiceps** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 34; Zahn in Pflzr. IV, 280, 1046.

Perennial. Stem 30–60 cm high, with short occasional hairs and scattered stellate-hairy. Basal leaves 0–2 (at anthesis often withering like lower cauline leaves), to 9 cm long (4:1), oblong or lanceolate, narrowed to winged petiole, subobtuse or acute, almost entire or small-toothed, glabrous above, scatteredly pubescent along margin and beneath with hairs 1 mm long; cauline leaves 4–12 (coefficient of leafiness 0.17), gradually decreasing upward, lanceolate, acute, base cuneate, sessile, short-serrate, scatteredly pubescent like basal leaves. Inflorescence open corymbose panicle, with 13(5–20) capitula; peduncles glabrous with occasional tiny glands 0.4 mm long, scatteredly stellate-hairy. Involucres 9–11 mm long; involucre bracts lanceolate, subacute, dark, with green border, glabrous, with sparse, 23(20–25), glands 0.5–1 mm long, almost without stellate hairs. Stigmas dark. Pappus snow-white. Flowering July to August.

Edges of mountain forests.—Maybe found in Western Transcaucasia. *General distribution*: Balkans-Asia Minor. Endemic. Described from former Artvin District. Type in Tbilisi.

47. **H. chloroleucolepium** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1913) 18; Zahn in Pflzr. IV, 280, 1040.

Perennial. Stem 50–60 cm high, slender to somewhat thick, at base densely covered with stiff hairs 2–2.5 mm long, less hairy above, glabrous in inflorescence but densely stellate-hairy. Basal leaves absent or few, obprolate, obtuse or oblong or broadly lanceolate, narrowed to somewhat short, broadly winged petiole, acuminate, with both sides quite densely short-setose-pilose, along margin glandular, sharply serrate, herbaceous; cauline leaves 8–10 (coefficient of leafiness 0.16), lower broadly lanceolate, broadly winged, short-petiolate or tapered toward base, sessile, almost amplexicaul, gradually decreasing upward, usually toothed, almost glabrous above, along margin setose, dark green, lighter beneath, upper leaves abruptly reduced (often undeveloped), lanceolate, sessile, subacute, stellate-hairy beneath. Inflorescence openly paniculate, with few or numerous capitula; peduncles glabrous or with occasional tiny glands, grayish-tomentose. Involucres 8–10 mm long, broadly ovate; involucre bracts linear-lanceolate, subobtuse, dark green, with occasional hairs, moderately glandular, grayish from stellate hairs. Stigmas dark. Flowering July to August.

Caucasus: Eastern Transcaucasia. Endemic. Described from Bakuriani. Type unknown.

48. **H. onosmaceum** Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 33; Zahn in Pflzr. IV, 280, 1047.

Perennial. Stem 20–30 cm high, 1.5 mm in diameter, at base violet and distinctly covered with white, stiff, straight hairs to 4 mm long, above with only single hairs here and there, more or less densely stellate-hairy in upper part. Basal leaves 2–5, lanceolate, tapering to short, winged, violet petiole, acuminate (4.3:1), finely or more or less distinctly toothed, glabrous above (or with occasional hairs along margin), beneath with scattered (10) hairs 2 mm long, along vein and petiole to moderate (16), 2.5 mm long, as a whole to scatteredly hairy with occasional tiny glands, bluish-green, lighter beneath, cauline leaves 3–6 (coefficient of leafiness 0.13), abruptly decreasing, lanceolate, like basal leaves (6:1), upper linear, entire, long-acuminate, somewhat stellate-hairy beneath. Inflorescence paniculate, with 2–7(–15) capitula, in part undeveloped; peduncles with occasional hairs 1 mm long and occasional glands 0.3 mm long, grayish from stellate hairs. Involucral bracts more or less narrowly lanceolate, acute, light green, with sparse, 18(15–20), light-colored hairs 1 mm long and similar, 16(15–18), glands 0.3 mm long, narrowly stellately edged along margins. Stigmas yellowish-brown, later turning dark. Flowering July to August.

Mountain pine forests.—May be found in Western Transcaucasia. *General distribution*: Balkans-Asia Minor. Described from former Olta District. Type in Tbilisi.

49. **H. sericicaule** Schelk. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 17; Zahn in Pflzr. IV, 280, 1047.

Perennial. Stem 30–40 cm high, slender, flexuous, at base reddish, somewhat hairy, but more or less densely white-sericeous above (including inflorescence), grayish in upper part from stellate hairs. Basal leaves (if persisting to anthesis): the lower short, elliptical-lanceolate, but remaining leaves and lower cauline leaves long (to 15 cm), tapered to long petiole, lanceolate, acute; all leaves finely crenate, on both sides scatteredly (or above sparsely), along midrib beneath and on petioles densely lanate with hairs 1–3 mm long; cauline leaves 2–5
56 (coefficient of leafiness 0.10), distant, gradually decreasing upward, densely hairy along margin and on petioles, with occasional tiny glands along margin, upper leaves scatteredly stellate-hairy beneath. Inflorescence paniculate, with 5–12 capitula; peduncles sparsely hairy, slightly glandular, white-tomentose. Involucres 8–9 mm long, ovate; outer involucre bracts short, obtuse, stellate-hairy, remaining ones broader, more or less acute, densely white-pilose, sparsely glandular, slightly stellate-hairy. Stigmas dark. Flowering July to August.

Caucasus: Southern Transcaucasia. Endemic. Described from Karabakh. Type unknown.

Cycle 14. Pseudotricha Juxip.—Cauline leaves few (2–8) (coefficient of leafiness 0.13); basal leaves persisting, 1 to 8 (average 4), to anthesis; involucre bracts moderately covered with hairs and glands; involucres usually large, 10–14 mm long; florets sometimes tubular.

50. **H. macrolepis** Boiss. Fl. or. III (1875) 873; Zahn in Pflzr. IV, 280, 1028, non Kindb. (1877).—*H. svaneticum* Somm. and Lev. in Nuovo Giorn. bot. ital. II (1895) 92; Peter, Beitr. Hier. Osteur. Orient. 28; Somm. and Lev. in Acta horti Petropol. XVI, 305.—*H. sparsum* auct. fl. caucas. non Frivaldsky; Grossh. Fl. Kavk. IV, 266.

Perennial. Stem 25–50 cm high, 1.5(–5) mm in diameter, more or less glabrous, with occasional (0–10) hairs 2.5–4 mm long or distinctly pilose (var. *pilosius* Litw. and Zahn) and violet at base, eglandular or with occasional glands below inflorescence, scatteredly stellate-hairy, usually branching from base. Basal leaves 2–7, narrowly lanceolate, to 15 cm long (6.5:1), tapering toward base to winged petiole, acuminate, barely or scatteredly, very finely serrate, sparsely (0–5) hairy above, scatteredly 8 (3–12) beneath, hairs 1.5–2 mm long, moderately, 14 (6–35), hairy beneath along midrib with hairs 2.5–3 mm long, along margin scatteredly with hairs 1.5 mm long, as a whole scatteredly or to moderately hairy, olive-green, paler beneath; cauline leaves 3–7 (coefficient of leafiness 0.14), lower long, remaining leaves abruptly reduced,

sessile, linear, along margin and beneath sparsely stellate-hairy. Inflorescence panicle, with 3–15 capitula; peduncles usually with occasional hairs 1.5 mm long or hairs scattered, 2.5 mm long (var. *pilosius* Litw. and Zahn), with occasional or few glands and scattered stellate hairs. Involucres 11–12.5(–13) mm long, cylindrical; involucral bracts usually 2-seriate, obtuse, dark, with occasional, 4(2–8) hairs 1 mm long or sparse (16), 2.5 mm long (var. *pilosius* Litw. and Zahn), with moderate number of glands 52(40–80), 0.4 mm long, more or less without stellate hairs. Stigmas dark. Flowering July to August.

- 57 Edges of montane forests, subalpine meadows, at 1200–2300 m.—*Caucasus*: Ciscaucasia, Dagestan, Eastern and Western Transcaucasia. *General distribution*: Balkans-Asia Minor (northern part of Asia Minor). Endemic. Described from Dagestan (Ruprecht) or Lazistan (Balansa). Type in Geneva.

51. **H. kiderense** Zahn in Fedde, Repert. IV (1907) 246; in Pflzr. IV, 280, 1028.

Perennial. Stem 25–30 cm high, 2 mm in diameter, straight, more or less glabrous, with scattered stellate hairs and occasional tiny glands below inflorescence. Basal leaves many (6), lanceolate, petiolate, acute (5.5:1), mainly at base (to middle) finely toothed, glabrous and somewhat lustrous above, scatteredly (8) hairy beneath, along midrib more or less densely (20) hairy, as on petiole (hairs 2.5 mm long); cauline leaves 4–5 (coefficient of leafiness 0.14), quite abruptly decreasing upward, narrowly lanceolate (7.3:1) to linear, pubescence half as much as on basal leaves, more or less sparsely stellate-hairy beneath. Inflorescence openly panicle, with 5–8(–12) capitula; peduncles glabrous, but moderately glandular, glands 0.3 mm long, scatteredly tomentose. Involucres 11.5 mm long, cylindrical, later ovate; involucral bracts almost 2-seriate, acute, dark, glabrous or with few (5) short hairs 1 mm long, but with large, dense (60) glands to 1 mm long, stellate-hairy at base. Florets tubular; stigmas dark. Flowering July to August.

Montane forests, at 1200 m.—*Caucasus*: Dagestan. Endemic. Described from Dagestan (Kidero). Type in Tbilisi; cotype in Leningrad.

Note. In habit similar to *H. macrolepis* Boiss., but is distinguished primarily by the tubular florets.

52. **H. simplicicaule** Somm. and Lev. in Nuovo Giorn. bot. ital. II (1895) 93, sub *H. svanetico* Peter in Nachr.-K. Ges. Wiss. Götting. (1898) 38; Somm. and Lev. in Acta horti Petropol. XVI, 311; Zahn in Fedde, Repert. IV, 244; in Pflzr. IV, 280, 1023.—**Exs.**: GRF No. 2091.

Perennial. Stem 30–70 cm high, 2–3 mm in diameter, at base sparsely hairy with hairs 2–5 mm long, eglandular, without stellate hairs. Basal

leaves 1-4(-7), oblong-lanceolate, tapered to petiole, mostly acuminate, to 17 cm long; often withering before anthesis; cauline leaves (3-)4-8 (coefficient of leafiness 0.14), gradually decreasing upward, uniformly distributed, lower leaves oblong-lanceolate, long-petiolate, middle and upper with broad, slightly cordate base, sessile, lanceolate (5:1); all leaves acute, sparsely fine-toothed, sparsely hairy above or with occasional hairs near margin, scatteredly hairy beneath, hairs 1.5-58 2.5 mm long, along midrib moderately hairy beneath with hairs 3 mm long, and along margin with sparse hairs 1-2 mm long. Inflorescence paniculate, with 5-20 capitula; peduncles glabrous or sparsely pilose, with black hairs 1 mm long and with scattered tiny glands 0.1-0.3 mm long, almost lacking stellate pubescence, involucre 10.5-12.5 mm long, almost 2-seriate, narrowly lanceolate, subobtusate, blackish-green, with occasional, 4(1-9), hairs 1 mm long and to moderate, 50(20-77) glands 0.2-0.5 mm long, without stellate hairs. Stigmas dark. Flowering July to August. (Plate VII.)

Montane coniferous and larch forests, subalpine meadows, at 640-2350 m.—*Caucasus*: Ciscaucasia, Eastern and Western Transcaucasia, Dagestan. Endemic. Described from Svanetia. Type in Florence; paratypes in Leningrad and Tbilisi.

Note. The species is marked by an almost complete absence of stellate pubescence and a light green color of the leaves.

53. **H. concinnidens** Zahn in Pflzr. IV, 280 (1922) 1028.

Perennial. Stem 25-35 cm high, slender, at base sparsely hairy, somewhat stellate-hairy above. Basal leaves—lower oblong-spatulate, obtuse, upper lanceolate, slightly narrowed to slender petiole, acuminate, bluish-green, glabrous above, moderately pilose (sometimes with spines) along margin and midrib beneath, and on petiole, narrowly and sharply serrate, teeth short and long; cauline leaves 4(-5) (coefficient of leafiness 0.13), entire, scatteredly stellate-hairy beneath. Inflorescence paniculate, of few capitula; peduncles glabrous and almost eglandular, somewhat stellate-hairy. Involucres 11-13 mm long; involucral bracts lanceolate, blackish-green, obtuse to subacute, with sparse hairs and glands; outer bracts somewhat stellate-hairy along margin toward base. Stigmas dark. Flowering July to August.

Mountain slopes 2100 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Abkhazia (Klukhor Pass). Type unknown.

54. **H. svaneticiforme** Litw. and Zahn in Fedde, Repert. IV (1907) 245 and in Sched. HFR, VII (1911) 38; Zahn in Pflzr. IV, 280, 1029.—**Exs.**: GRF No. 2092.

Perennial. Stem 15–45 cm tall, 2–3 mm in diameter, with scattered 3–5 mm long hairs, denser at base (often 2–3 stems from one stock). Basal leaves 4–8 or only 1–3 at anthesis, remaining ones withering lanceolate, narrowed to long winged petiole to 18 cm long (6:1) acuminate, somewhat finely and sparsely toothed or entire, light olive-green above, paler beneath, scatteredly pubescent, glabrous above, scatterly (9) pubescent beneath and along margin with hairs 2 mm long; cauline leaves (2–)3–4(–5) (coefficient of leafiness 0.12), distant, lanceolate, 59 like basal, uppermost leaves linear. Inflorescence lax panicle with 7(4–15) capitula; peduncles moderately covered with dark hairs 2–3 mm long, or scatteredly glandular, with glands 0.3 mm long, scatteredly tomentose. Involucres 10.5–12 mm long, cylindrical, later truncate; involucral bracts 2–3-seriate, subacute, blackish, with light green border outer loose, moderately to densely, 52(39–76), covered with dark hairs 1–2 mm long, and similarly with 57(44–79) glands 0.4 mm long, scatteredly stellate-hairy along margin to bearded tip. Florets mostly tubular, stigmas dark or black. Flowering July to August.

On rocks in subalpine zone at 2160–2400 m.—*Caucasus*: Ciscaucasia, Talysh(?). Described from Teberda. Type in Tbilisi; cotype in Leningrad.

In habit it resembles *H. macrolepis* Boiss. but is distinguished by the conspicuous hairs on the peduncles and the involucral bracts and by the denser tomentum.

55. ***H. subsimplex*** Somm. and Lev. in Nuovo Giorn. bot. ital. II (1895) 94; Peter, Beitr. Hier. Osteur. Orient. 30; Somm. and Lev. in Acta horti Petropol. XVI, 306, sub *H. baumgarteniano* Schur; Zahn in Pflzr. IV, 280, 1027.

Perennial. Stem 18–25 cm high, straight, reddish at base scatteredly, above sparsely pilose or almost glabrous. Basal leaves 3–4, large (to 12 cm long), oblong-lanceolate, more or less long-petiolate, acute, usually small-toothed; cauline leaves 2–3 (coefficient of leafiness 0.12), lanceolate, sessile, somewhat tapering base, acute, abruptly decreasing upward, sparsely, but along margin and midrib (and petioles) beneath, distinctly pubescent, hairs 2–4 mm long, scatteredly stellate-hairy beneath; bracteal leaves subulate. Inflorescence with few (1–3) capitula; peduncles (more or less) glabrous, with sparse tiny glands and stellate hairs. Involucres 10–12 mm long; involucral bracts 2–3-seriate, subacute, dark, glabrous, with sparse glands, without stellate hairs. Stigmas dark. Achenes 4 mm long, brown. Flowering July to August.

On granite rocks in mountains at 2200–2300 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Abkhazia (Klukhor Pass). Type in Florence.

Note. *H. baumgartenianum* Schur. is an obscure species; Peter (Naeg. and Peter, *Hier. Mitteleur.* II (1886) 99) included it in the section *Villora*.

56. ***H. lailanum*** Schelk. and Zahn in *Izv. Kavk. Muzeya*, VII (1912) 136; Zahn in *Pflzr.* IV< 280, 1023.

Perennial. Stem 40–60 cm high, 2–3 mm in diameter, sparsely pubescent at base, with occasional hairs 1.5–2.5 mm long and tiny glands above, somewhat stellate-hairy, sometimes branched from base.
 60 Basal leaves 1–5, outer ovate, obtuse, inner oblong-lanceolate, petiolate, to 14 cm long (6:1), subobtuse or subacute, finely crenate, more or less glabrous above, with occasional hairs beneath, along midrib more or less numerous, along margin moderately hairy, without stellate hairs, cauline leaves 3–6 (coefficient of leafiness 0.10), distant, lanceolate to linear, 2–3 lower leaves often distinctly sharply toothed, all long-acuminate; leaves on branches long, acute. Inflorescence openly corymbose-paniculate, with 5–18 capitula; peduncles with occasional, short hairs, 1 mm long and tiny glands, 0.2 mm long, more or less without stellate hairs. Involucre 12–14 mm long; involucre bracts almost 2-seriate, lanceolate, more or less obtuse, outer erect, few, with occasional, 10(7–12), hairs 1 mm long and moderate 60(30–80) number of glands 0.2–0.4(–0.8) mm long, almost without stellate hairs. Stigmas dark. Flowering July to August. (Plate VIII.)

Mixed forests, along mountain slopes, 1200–2100 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Svanetia (Abakura Pass). Type in Tbilisi; cotype in Leningrad.

Cycle 15. Sparsa Juxip.—Cauline leaves few (1–5) (coefficient of leafiness 0.10); inflorescence (involucre bracts and peduncles) without hairs and glands; involucre 8–9 mm long; leaves short, to 3 cm long, broadly lanceolate (4:1), toothed; plants of Caucasus.

57. ***H. georgicum*** Fr. *Epigr.* (1862) 106; Zahn in *Pflzr.* IV, 280, 1019.

Perennial. Stem, 30 cm high, entirely glabrous. Basal leaves oblong, to 2.5 cm long, short-petiolate, obtuse, short-toothed, lower teeth retrorse; cauline leaves 1–5 (coefficient of leafiness 0.10), amplexicaul, with ligules, upper leaves bracteate. Inflorescence of 3 capitula; capitula pauciflorous; peduncles slender, glabrous. Involucres 8–9 mm long; involucre bracts more or less 2-seriate, obtuse, dark, glabrous, outer short and loose, distant. Stigmas dark. Corolla teeth ciliate. Flowering July to August.

Caucasus: Eastern Transcaucasia. Endemic. Described from Georgia. Type unknown.

Note. The description is based on the extremely incomplete diagnosis of the author. This species is quite close to *H. sparsum* Friv. The species typical for the subsection, *H. sparsum*, described by Frivaldsky from Bulgaria, is not found in our country.

Cycle 16. *Hololeia* Juxip.—Cauline leaves few (6–10) (coefficient of leafiness 0.10); inflorescence (involucral bracts, peduncles) glabrous, without glands and stellate hairs; involucre 10–12(–15) mm long; leaves narrowly lanceolate (20–30:1), long (to 50 cm). Plants of the Far East.

58. ***H. hololeion* Maxim.** Prim. Fl. Amur. (1859) 182; Fl. Epicr. 139; Komarov, Fl. Manch'zh. III, 793, Zahn in Pflzr. IV, 280, 1019; Kom. and
61 Alis. Oprod. Rast. Dal'nevost. Kr. II, 1102; non N.P.—*Hololeion maximowiczii* Kitamura in Acta Phytotax. et Geobot. X, No. 3 (1941) 301.—**Ic.:** Kom. and Alis. op. cit.

Perennial. Stem 30–150 cm high, slender, straight, angular-sulcate, entirely glabrous. Basal leaves absent at anthesis or 1–2; cauline leaves 6–10 (coefficient of leafiness 0.10), linear-lanceolate, long (lower leaves up to 50 cm), more or less narrow (15–30:1), gradually tapering to broad winged petiole, acuminate, gradually merging with bracteal leaves, all entire, light bluish-green, sometimes violet, glabrous. Inflorescence openly corymbosely paniculate, with (5–)15–60 capitula; peduncles divaricately branched, 1–3.5 cm long, slender, glabrous. Involucre 10–12(15) mm long, cylindrical; involucral bracts 2–3-seriate, outer short, oval, obtuse (2–3 mm long), middle and inner broadly lanceolate, obtuse or subacute, with dark ciliate tip, glabrous; florets pale yellow. Stigmas dark. Achenes 5.5–6 mm long, light brown. Flowering July to August. (Plate III, Fig. 2.)

Hummocky valley meadows with peaty soil and meadow bogs.—*Far East:* Ussuri. *General distribution:* Japan, China. Described from Primorsk Territory. Type in Leningard.

Note. Zahn listed *H. hololeion* Maxim. as a subspecies of the Balkan *H. sparsum* Friv.; however, just a glance is enough to be convinced that it is entirely different from *H. sparsum* Friv. in habit as well as in other characters. To the morphological difference are added also the range and differences in the ecology of the two species; *H. sparsum* grows in the Balkans, *H. hololeion* in the Far East and unlike most hawkweeds, generally in clearly expressed mesophilic habitat conditions. Therefore, we separate *H. hololeion* as a member of the cycle (*Hololeia* Juxip), although it is quite possible to raise this species to the rank of a member of a special section (with no less justification than, for example, for *H. schmalhausianum*). At the very

first glance, *H. hololeion* in its habits reminds one of *Crepis* or even *Cicerbita*.

S. Kitamura [Acta Phytotax. et. Geobot., Kyoto, X, No. 3 (1941) 301] even established a separate genus *Hololeion* Kitamura in which our *Hieracium hololeion* Maxim. is listed under the name *Hololeion maximowiczii* Kitamura.

One more closely related species—*Hololeion krameri* Kitamura (= *Hieracium krameri* Franchet and Sav.) can be found in the Far East, differing from *Hieracium hololeion* Maxim. by having acute involucre bracts, a large number of bracteal leaves, longer peduncles, 3.5–10 cm long, and achenes (7.5–9 mm).

Cycle 17. Pseudosvanetica Juxip.—Cauline leaves few (2–7) (coefficient of leafiness 0.08): basal leaves usually present (0.6) at anthesis; glands on involucre bracts quite dense (100–190); base of lamina gradually tapering to petiole.

- 62 59. **H. villosellipes** Zahn in Izv. Kavk; Muzeya, VII (1912) 137; Zahn in Pflzr. IV, 280, 1035.

Perennial. Stem up to 60 cm high, quite villous at base, hairs 3–4 mm long, sparsely pilose and somewhat glandular above, with stellate hairs. Basal leaves usually withering before anthesis; cauline leaves 6–7 (coefficient of leafiness 0.10), distant, 2 lower leaves often long to 18 cm (9–12:1), remaining broadly-lanceolate, at base sharply toothed, above short-toothed, tapering to broadly winged, villous petiole, on both sides scatteredly pilose, upper leaves oblong- or ovate-lanceolate, with cuneate or rounded, often coarsely toothed, semiamplexicaul base, somewhat stellate-hairy beneath. Inflorescence peniculate, with 5–12(–18) capitula; peduncles with occasional hairs and scattered tiny glands, densely tomentose. Involucres 9.5–10 mm long; involucre bracts linear-lanceolate, somewhat obtuse, sparsely, 20(14–25), hairy and glandular, 27(25–30), with hairs 1 mm long and fine glands 0.4–0.5 mm long, slightly stellate-hairy (at base). Florets tubular; stigmas dark. Flowering July to August.

Caucasus: Western Transcaucasia. Endemic. Described from Dzhikhis-Dzhari. Type in Tbilisi.

60. **H. miansarofii** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 17; Zahn in Pflzr. IV, 280, 1035.

Perennial. Stem up to 55 cm high, slender, usually purple, at base very densely pubescent, upwards somewhat short- and soft-hairy, densely stellate-hairy in upper part, slightly glandular below inflorescence. Basal leaves oblong-lanceolate, to 15 cm long (4.3:1), narrowed



to short, winged, densely and softly pubescent petiole, subacute (lower obtuse) more or less glabrous above, sparsely soft-pubescent beneath, along margin densely ciliolate, dark green and lustrous above, paler beneath with distant small teeth; cauline leaves 5–6 (coefficient of leafiness 0.10), distant, usually small-toothed, lower 3 leaves like basal, with winged petiole others sessile, with narrowed base, abruptly decreasing upward, slightly stellate-hairy beneath; upper leaf linear, more or less undeveloped. Inflorescence openly paniculate, with 25–30 capitula; peduncles with occasional hairs, more or less densely glandular, grayish-tomentose. Involucres 10–12 mm long, cylindrical; involucre bracts linear-lanceolate, more or less acute, outer narrow, along margin densely stellate-hairy, somewhat pilose, with hairs 1 mm long, moderately glandular, grayish-green from stellate hairs. Stigmas dark. Flowering July to August.

65 Mountain slopes.—*Caucasus*: Western and Eastern Transcaucasia. Endemic. Described from Bakuriani. Type unknown.

Note. According to Zahn, it is an intermediate form between *H. pseudosvaneticum* and *H. erythrospermum*.

61. *H. subbakurianiense* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 469.

Perennial. Stem to 50 cm high, 2 mm in diameter, at base violet, sparsely hairy with hairs 2.5–1.5 mm long. Basal leaves mostly withering before anthesis (0–2), lanceolate, tapering to long petiole, almost entire, to 15 cm long (5:1), scatteredly pubescent, violet beneath; cauline leaves 5 (coefficient of leafiness 0.10), lanceolate, narrowed to short petiole or sessile, sparsely (2–4) fine-toothed, acuminate; upper leaves linear, glabrous above; sparsely or scatteredly (6–11) hairy, beneath and along margin with hairs 1–2 mm long, moderately (15) along midrib beneath, hairs 2 mm long. Inflorescence paniculate, with 12 capitula; peduncles more or less glabrous, sparsely glandular, glands 0.5 mm long, scatteredly stellate-hairy. Involucres 11–11.5 mm long; involucre bracts almost 3-seriate, lanceolate, subacute, with occasional (7–14), hairs 1 mm long, densely (80–83) glandular with glands 0.3–0.5 mm long and almost without stellate hairs. Stigmas dark. In habit like *H. vulgatum* Fr. s. l. Flowering August.

Mountains at 1500 m.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Bakuriani (collected by A. Fomin). Type in Tbilisi.

Note. The above specimen was identified by Zahn as *H. bakurianiense* Fom. and Zahn; however, the results of our examination do not agree with Zahn's diagnosis (*Pflzr.* 1048).

62. **M. tschkhubianischwillii** Kem.-Nat. in Zam. po Sist. i Geogr. r. Tbil. Bot. Inst. 17 (1953) 127; (em. Juxip); Fl. Gruzii, VIII, 72 (descr. georg.).—*H. agassii* Kem.-Nat. in Dokl. Akad. Nauk ArmSSR, XII (1953) 79.—**Ис.:** Fl. Gruzii, VIII (l. c.; Male procedere).

Perennial. Stem 15–30 cm high, often 2, 1–1.5 mm in diameter, moderately hairy with soft hairs, 3–3.5 mm long, sparsely glandular above, with tiny glands, 0.1–0.2 mm long. Basal leaves 2, oblong-spatulate and lanceolate, to 10 cm long (5:1), more or less entire, narrowed to winged, villous petiole, above with occasional (2–5) hairs, 2.5–3 mm long, moderately (14–18) hairy beneath with hairs, 2.5 mm long, densely (28–36) hairy along midrib, hairs 3–5 mm long, with scatteredly (10–12) hairy along margin, hairs 2.5–3 mm long; cauline leaves (1–)2 (coefficient of leafiness 0.09), lower leaf like basal, upper sessile, lanceolate, acuminate. Inflorescence openly paniculate, with 66 2–3 capitula; peduncles sparsely hairy; hairs 2.5 mm long, but very densely glandular with well developed glands, 0.5 mm long, weakly tomentose. Involucres 8–10 mm long, ovate involucral bracts few, loose, narrow, linear-lanceolate, acute, sparsely hairy, 17(13–20), with hairs 3 mm long or with scattered, 33 (30–35), glands 0.4–0.5 mm long, weakly stellate-hairy. Stigmas yellow. Achenes 3(–4) mm long, chestnut-coloured. Flowering July to August.

Alpine and subalpine meadows.—*Caucasus*: Eastern and Southern Transcaucasia. Endemic. Described from Ak-Dag in Armenia. Type in Erevan?

63. **H. sobrinatum** Litw. and Zahn in Fedde, Repert. IV (1907) 260; Zahn in Pflzr. IV, 280, 1035.

Perennial. Stem to 50 cm high, slender, at base with soft hairs to 5 mm long, glabrous above, more or less without stellate hairs. Basal leaves fewer, lanceolate, to 15 mm long, toward base more or less narrowed to winged petiole, serrate, glabrous above, along margin more or less densely setose with bristles 4 mm long, bluish-green, scatteredly hairy and light-green beneath, cauline leaves 3(–4) (coefficient of leafiness 0.07), gradually decreasing upward, narrow, with tapered base, sessile almost entire, slightly stellate-hairy. Inflorescence openly paniculate with (3–)4–10 capitula; peduncles glabrous with scattered, tiny glands, particularly toward base of capitula sparsely tomentose. Involucres 9 mm long, ovate, involucral bracts narrow, acute, few, dark green with light-colored edges, moderately hairy, with hairs 1 mm long; scatteredly fine-glandular, along margin somewhat stellate-hairy. Stigmas dark. Flowering July to August.

Mountain slopes, at 1260 m.—*Caucasus*: Ciscaucasia. Described from Teberda. Type unknown.

Note. Zahn considered this species an intermediate between *H. simplicicaule* and *H. erythrocarpum* to which he also referred *H. niphocladum*, which is distinctly different from it.

64. ***H. pseudosvaneticum*** Peter in Beitr. Hier. Osteur. Orient. (1898) 35, pro sp.; Somm. and Lev. in Acta horti Petropol. XVI, 309; Zahn in Pflzr. IV, 280, 1034.—*H. svaneticum* var. *corymbiferum* Somm. and Lev. in Nuovo Giorn. bot. ital. II (1895) 93.—*H. corymbulosum* Somm. and Lev. ex. Pet. l. c. 38; Acta horti Petropol. XVI (1900) 311.

Perennial. Stem 45–55 cm high, fistular, sulcate, 2–4 mm in diameter, branched above (or from base), with sparse hairs 2–4 mm long, stellate-hairy from inflorescence to middle. Basal leaves 2–6, oblong or elliptical, short or to 20 cm long (6:1), narrowed to long petiole, short-
67 spinescently acuminate, finely toothed or with 6–8 short, serrate, teeth (on both margins), scatteredly hairy on both sides, more or less densely along midrib and petiole beneath, light green; cauline leaves 2 (coefficient of leafiness 0.04) (f. *pseudosvaneticum* Peter) or to 5, abruptly decreasing upward (coefficient of leafiness 0.06), short-petiolate or sessile (f. *corymbulosum* Somm. and Lev.), scatteredly stellate-hairy beneath. Inflorescence paniculate umbellate, with 15–35 capitula; peduncles with occasional hairs, more or less densely glandular (glands abruptly disappearing downward), scatteredly stellate-hairy; involucre 8–10 mm long; involucre bracts few, subobtusate or subacute, dark, with quite narrow light-colored border, glabrous or with occasional hairs, but densely (110) glandular with glands 0.2–0.4 mm long, more or less without stellate hairs (except only at base). Stigmas dark. Flowering July to August.

Subalpine meadows.—*Caucasus*: Eastern and Western Transcaucasia. Described from Svanetia. Type in Tbilisi.

Note. The specimen from Tbilisi examined by us (identified by Zahn) had abundant pollen, which is an extremely rare phenomenon in *Euhieracium* in general, and in *Pseudostenotheca* in particular.

65. ***H. subsvaneticum*** Litw. and Zahn in Fedde, Repert. IV (1907) 259; Zahn in Pflzr. IV, 280, 1035.

Perennial. Stem 40–60 cm high, often many, 2.5–4 mm in diameter, with sparse soft hairs 2.5 mm long, more or less without stellate hairs. Basal leaves 2–4 (upper leaves often withering), oblong-lanceolate, very large (to 18 cm long) (6:1), narrowed to long winged petiole, acuminate, glabrous above, scatteredly hairy beneath and along margin, densely along midrib beneath, hairs 1–1.5 mm long, sparsely finely toothed, olive-green above, light green beneath; cauline leaves 2–3 (coefficient of leafiness 0.05), lanceolate, long-acuminate, sessile,

narrowed to winged base, with unequal small (or more or less coarse) teeth; upper leaves narrowly lanceolate, without stellate hairs. Inflorescence openly paniculate, with 5–10(–12) capitula; peduncles with few, hairs 1.5 mm long, with scattered, glands 0.4–0.5 mm long, quite scatteredly stellate-hairy; involucre 10–11 mm long, ovate; involucre bracts broad, lanceolate, almost 2-seriate, subacute, outer narrow, short, dark with light-colored border, with sparse, 16(8–24), hairs 1–1.5 mm long or without hairs (f. *kochtae* Zahn); with very dense (70–80) glands 0.5–1 mm long, along margin scatteredly stellate-hairy. Florets tubular; stigmas initially yellowish-brown, later dark. Achenes 4 mm long. Flowering July to August.

Subalpine meadows.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from Teberda. Type in Tbilisi; paratype in Leningard.

68 *Cycle 18. Erythrocarpa Juxip*.—Cauline leaves 1–5, coefficient of leafiness 0.08(0.13–0.04); basal leaves 2–9 at anthesis; glands dense, 70(40–110), on involucre bracts; base of lamina more or less truncate or abruptly narrowed in petiole.

66. *A. aryslynense* Zahn in Pflzr. IV, 280, (1922) 1045.

Perennial. Stem slender, at base moderately, above somewhat more densely hairy and with stellate hairs, usually branching from base. Basal leaves (partly withering before anthesis) broadly lanceolate, narrowed to slender petiole and acuminate, subobtusely or acute, small-toothed, with occasional or few hairs (or without) above; cauline leaves 3–5, gradually decreasing, lanceolate, short-petiolate or cuneate at base, acute, serrate, upper narrow to subulate, stellate-hairy beneath. Inflorescence paniculate, with 3–15 capitula, some undeveloped; peduncles somewhat hairy, very sparsely and finely glandular, grayish-tomentose. Involucre 9–10 mm long, broad; involucre bracts narrow more or less acute, dark green, with scattered hairs 1 mm long and solitary glands, at base somewhat stellate-hairy. Habit like *H. vulgatum* ssp. *irriguum*. Flowering July to August.

Mountains, in alpine zone, at 2400 m.—*Central Asia*: Tien Shan. Endemic. Described from Aryslyn. Type unknown.

Note. The description is based on Zahn's (incomplete) diagnosis.

67. *H. samurense* Zahn in Fedde, Repert. IV (1907) 258; in Pflzr. IV, 280, 1045.

Perennial. Stem 20–35 cm high, slender, scattered-hairy and with stellate hairs. Basal leaves more or less numerous, elliptical or oblong-lanceolate, short-petiolate, mostly acute, finely toothed or more or less

serrulate, teeth with glandular acute tips, with scattered short and stiff hairs above, moderately hairy beneath, along margin and midrib beneath more or less densely hairy with hairs 2–2.5 mm long, along petioles (particularly at base) more or less villous, along midrib beneath with occasional tiny glands; cauline leaves 3–4 (coefficient of leafiness 0.13), more or less abruptly decreasing upward, narrow-lanceolate to linear, upper leaves more or less stellate-hairy beneath. Inflorescence paniculate, with 3–7(–12) capitula; peduncles moderately hairy with short (0.5–1 mm long) hairs and also sparsely glandular and grayish-pubescent. Involucre 9 mm long, cylindrical, later ovate; involucre bracts acute, moderately pubescent with sparse glands, toward base scatteredly stellate-hairy. Stigmas blackish; florets usually tubular. Flowering June to August.

In subalpine zone.—*Caucasus*: Eastern Transcaucasia. Dagestan. Endemic. Described from Dagestan. Type unknown.

- 69 68. **H. macrolepioides** Zahn in Fedde, Repert. IV (1907) 258; in Pflzr. IV, 280, 1045.

Perennial. Stem 20–40 cm high, 1.5 mm in diameter, sulcate, with occasional short hairs, sparsely stellate-hairy above, stems often many. Basal leaves 3–4, broadly lanceolate, narrowed to winged petiole acuminate, finely toothed, on both sides with or without occasional hairs, along midrib beneath near base moderately covered with 2.5–3 mm long hairs, light olive-green; cauline leaves 3–4 (coefficient of leafiness 0.13), distant, lanceolate, gradually decreasing upward, like basal leaves (6:1), sessile, with tapered short base, considerably less hairy than basal leaves or almost glabrous, sparsely stellate-hairy beneath. Inflorescence lax (furcate) panicle with (2–)4–8(–15) capitula; peduncles slender, with or without occasional short hairs, with occasional glands 0.3 mm long, scatteredly tomentose. Involucre 9–10.5 mm long; involucre bracts narrow, acuminate, almost 2-, 3-seriate, dark green with light green edge, with sparse, 11(5–18), hairs 1 mm long and also 15(13–17), glands 0.3 mm long, slightly stellate-hairy (at base). Stigmas darkish. Flowering June to August.

Mountain forests, dry slopes and subalpine meadows, at 1100–1950 m.—*Caucasus*: Ciscaucasia, Dagestan, Western Transcaucasia. Described from Dagestan. Type in Tbilisi.

- 69 69. **H. macrolepidiforme** Zahn in Vestn. Tifl. Bot. Sada, 21 (1912) 8 in Pflzr. IV, 280, 1039.

Perennial. Stem 30–45 cm high, 2 mm in diameter, with occasional short hairs, with occasional tiny (0.2 mm long) glands above. Basal leaves 2–9, lanceolate, to 13 mm long, narrowed to short winged

petiole, acuminate (4.5:1), finely (4–5) toothed, on both sides as also along margin with occasional, (4–9), hairs 1–1.5 mm long, moderately (10–18) hairy beneath along midrib, along margin with occasional tiny glands; cauline leaves 3–4(–5) (coefficient of leafiness 0.11), lanceolate, almost entire, lower leaves narrowed to short petiole, upper sessile, with tapered base, moderately hairy. Inflorescence corymbose-panicle, with 5–13 capitula; peduncles glabrous or with occasional hairs 1 mm long, and glands 0.2 mm long, grayish-tomentose. Involucres 9–10 mm long; involucre bracts acute, glabrous, with scattered, 34(23–45), glands 0.5 mm long, more or less without stellate hairs. Stigmas dark. Habit like *H. macrolepis* Boiss., distinguished primarily by much shorter involucre. Flowering July to August.

Subalpine meadows.—*Caucasus*: Dagestan, Western Transcaucasia. Endemic. Described from Upper Adzharia (Bodysh). Type in Tbilisi.

70. ***H. amphitephrodes*** Sosn. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 16; Zahn in Pflzr. IV, 280, 1040.

Perennial. Stem 15–35 cm high, covered with white hairs, densely stellate-hairy, in upper part glandular. Basal leaves oval, rotund, broadly ovate-lanceolate, with rounded base or base abruptly narrowed to short petiole, acuminate, finely-toothed or at base coarsely toothed, on both sides scatteredly pubescent, along margin and petiole more or less densely pubescent, dull green or somewhat purple; cauline leaves 1–3(–4) (coefficient of leafiness 0.10), broadly ovate-lanceolate, lower short-petiolate, upper considerably shorter, sessile, sparsely stellate-hairy beneath. Inflorescence openly peniculate, with 3–25 capitula; peduncles almost without hairs, densely glandular, grayish-tomentose. Involucre 10 mm long; involucre bracts lanceolate, acute, dark green, glabrous, densely glandular, along margin throughout densely stellate-hairy, at tip shaggy (involucre bracts when young, distinctly varicose: due to dark outer surface and dense light-colored stellate border). Stigmas initially yellow, later dark. Flowering July to August.

Alpine belt.—*Caucasus*: Western Transcaucasia. Endemic. Described from Sochi District (Fisht). Type unknown.

71. ***H. brandisianum*** Zahn in Magyar bot. lapok (1906) 83; in Pflzr. IV, 280, 1042; in Asch. and Graebn. Synopsis, XII, III, 668.

Perennial. Stem to 30 cm high, basally pilose, stellate-hairy above and with occasional glands. Basal, obtuse-rounded leaves ovate or elliptical, inner ovate- or oblong-lanceolate, subacute, abruptly or gradually narrowed to petiole, small-toothed or at base of lamina coarsely toothed, glabrous above and with very sparse hairs, along midrib beneath and petiole tomentose with hairs 2–4 mm long; cauline leaves

2 (coefficient of leafiness 0.07), more or less small, lanceolate or linear. Inflorescence paniculate, with 3–8(–12) capitula; peduncles moderately hairy and similarly glandular, somewhat stellate hairy. Involucres 10–12 mm long; involucral bracts blackish-green, acute to very acute (inner bracts), with scattered hairs and glands, with stellate hairs only at base. Stigmas yellowish, later brown. Flowering July to August.

Alpine meadows.—*Caucasus*: Western Transcaucasia. *General distribution*: Central Europe(?) (eastern part), Balkans-Asia Minor. Described from Yugoslavia (Bosnia). Type unknown.

72. **H. glomerellum** Zahn in Fedde, Repert. IV (1907) 249; in Pflzr. IV, 280, 1041.

Perennial. Stem 20–35 cm high, 1.5–2.5 mm in diameter, sulcate, at base covered with hairs 2–3 mm long, stellate-hairy whole length.
 71 Basal leaves 3–4, oblong-lanceolate, narrowed to winged petiole to 13 cm long (5:1) subobtuse or acute, finely-toothed toward tip, often coarsely toothed toward base and with toothed petiole, on both sides more or less moderately pubescent, densely hairy along margin and midrib beneath, hairs 1–2.5 mm long; cauline leaves 2 (coefficient of leafiness 0.07), lower like basal leaves, with tapered or broad base transitional to short, winged petiole; upper leaf narrow-lanceolate, stellate-hairy beneath. Inflorescence paniculate, in upper part clustered, crowded, below scattered, with 7–10(–15) capitula; peduncles moderately or densely covered with light-colored hairs having dark base and scatteredly glandular, grayish-tomentose. Involucres 8–10 mm long, cylindrical ovate, later truncate; involucral bracts more or less acute, dark green, moderately or densely hairy, scatteredly glandular, stellate hairs only at base. Stigmas yellowish-brown, later dark, florets somewhat tubular. Flowering July to August.

Oak and oak-pine montane forests with *Rhododendron flavum*.—*Caucasus*: Dagestan. Endemic. Described from Alagir District (Dagestan). Type unknown.

73. **H. erythrocarpum** Peter, Beitr. Hier. Oesterr. Orient. (1898) 36; Somm. and Lev. in Acta horti Petropol. XVI, 309; Zahn in Fedde. Repert. IV, 250; in Pflzr. IV, 280, 1039; in Asch. u. Graebn. Synopsis, XII, III, 663.—*Exs.*: GRF Nos. 2072, 2073.

Stem 25–55 cm high, 1.5–3 mm in diameter, at base sparsely pilose (f. *pilosum* Zahn), with hairs 1–1.5 mm long, in upper part almost glabrous and usually without glands, but with stellate hairs. Basal leaves 3–6(–8) or 0–2 (var. *β. divisiforme* Litw. and Zahn), to 15 cm long (4:1), lanceolate, abruptly or gradually narrowed to petiole, finely

or coarsely acute-toothed (3–5), glabrous above or with occasional hairs, sparsely or moderately pubescent beneath with hairs 0.5–1.2 mm long, along midrib beneath and margin sparsely or densely pubescent with hairs 1–2 mm long; cauline leaves 2(–3) or 3–4(–5) (var. *β. divisiforme* Litw. and Zahn), broadly or narrowly lanceolate (coefficient of leafiness 0.06), lower like basal leaves, upper considerably smaller, sessile, pubescent like basal. Inflorescence paniculate, with fewer, 4(2–8) capitula; peduncles glabrous or with occasional hairs 1 mm long, occasionally or sparsely glandular, more or less tomentose. Involucres 10–11.5 mm long, cylindrical; involucral bracts almost 3-seriate, acute, dark, without hairs or with occasional (0–8), hairs 1–1.5 mm long, with scattered, 37(22–60), glands 0.3–1(–2) mm long, with stellate hairs only at base. Stigmas yellowish-brown, later dark. Achenes 3.5–4 mm long, immature achenes red, mature brown. Flowering July to August. (Plate IX, Fig. 1.)

Mixed and coniferous forests, subalpine pine forests, along glacial moraines, at 600–2640 m.—*Caucasus*: Ciscaucasia, Degestan, Eastern 72 and Western Transcaucasia; *Central Asia*: Syr-Darya (Kokamyr). *General distribution*: Balkans-Asia Minor. Described from Bulgaria. Type unknown.

Note. The name “*erythrocarpum*” was given because Peter, who described the species, had a specimen with immature, (red) achenes, which later turn chestnut-brown.

The species is quite variable in pubescence.

74. **H. heterodontoides** Litw. and Zahn in Fedde, Repert. IV (1907) 257; Zahn in Pflzr. IV, 280, 1038.

Perennial. Stem 35–55 cm high, 1.5–2 mm in diameter, sulcate, at base sparsely soft-pilose (hairs to 3 mm long), above with occasional hairs and glands, scatteredly stellate-hairy. Basal leaves 6–7, broadly lanceolate, to 18 cm long, (3:1). Their base truncate or abruptly tapered to petiole, unevenly coarsely toothed, teeth triangularly- or narrowly lanceolate, acute, with glandular tips, on both sides with occasional (4–8) hairs 1 mm long, with few (12–14) hairs 2 mm long along midrib beneath, petioles villous with soft hairs 2–3 mm long, stramineous-yellowish-green above, lighter beneath; cauline leaves 3(–4) (coefficient of leafiness 0.07), considerably smaller than basal, lanceolate, lower petiolate, others sessile, with tapered base, distinctly toothed, on both sides (or only beneath) densely (20–40) hairy with short (0.5–1.5 mm long) hairs, along margin to moderately (16–18) hairy with hairs 1 mm long, densely (40–60) hairy beneath along midrib with hairs 2 mm long (four times denser than basal leaves), upper leaves also with stellate hairs. Inflorescence paniculate, with 5–8 capitula, often

undeveloped; peduncles slender, without hairs, sparsely or scatteredly glandular, glands 0.4 mm long, weakly tomentose. Involucres 8.5–9.5 mm long, cylindrical-ovate, later truncate, involucre bracts almost 2-seriate, outer short (4 mm long), subacute, inner (8 mm long) broad, subobtusate, dark green, glabrous, moderately (40–50) glandular, glands 0.4 mm long, and at base somewhat stellate-hairy. Stigmas dark. Flowering July to August.

Montane forests at 920 m.—*Caucasus*: Ciscaucasia, Western Transcaucasia. Endemic. Described from Pyatigorsk (Beshtau). Type in Tbilisi; paratype in Leningrad.

Note. A variety is found with finely toothed, elliptical-lanceolate leaves and tubular forests (var. *β. subdentatum* Zahn, l. c.).

75. *H. ratluense* Zahn in Fedde, Repert. IV (1907) 323; in Pflzr. IV, 280, 1060; Grossh. Fl. Kavk. iv, 267.

Perennial. Stem 35–55 cm high, straight, sulcate, scatteredly but at base moderately hairy with soft hairs 2–2.5 mm long, scatteredly glandular above, basal leaves few at anthesis, more or less long-petiolate, elliptical-lanceolate, distant and finely crenate or close to base toothed more or less acute, quite large, glabrous above (or with very sparse hairs), beneath scatteredly, along margin and midrib quite densely covered by hairs 1–2 mm long; cauline leaves 2–4 (coefficient of leafiness 0.07), scattered, gradually or abruptly reduced upward, lowest winged-petiolate, upper ones narrowed to base, sessile, semi-amplexicaul. Inflorescence paniculate, with (4–)7–16(–35) capitula, with long, obliquely divergent branches; peduncles glabrous, more or less densely glandular, grayish upward; involucres 9–10 mm long, ovate-cylindrical; involucre bracts subacute, outer ones blackish, only at base somewhat stellate-pubescent, inner ones dark green with pale margin, glabrous, densely glandular; florets more or less tubular; stigmas very dark; habit similar to *H. juranum* Fr., differing from it by having fewer cauline leaves. Flowering July to August.

Montane pine forests.—*Caucasus*: Dagestan. Endemic. Described from Dagestan (Ratlu). Type unknown.

76. *H. caloprasinum* Zahn in Vestn. Tifl. Bot. Sada, 12 (1908) 20; in Pflzr. IV, 280, 1041.

Perennial. Stem 30–40 cm high, 2.5 mm in diameter, green, at base violet, with occasional hairs, without stellate hairs. Basal leaves 4–5, oval, obtuse or ovate-lanceolate, broad, somewhat obtuse or spinescent, to 10 cm long (2.7:1), tapered more or less abruptly to petiole, serrate (teeth 5–7) with long glanduliform cusps; above glabrous, beneath with few hairs 1–1.5 mm long, along midrib and

margin scatteredly or sparsely hairy, with few tiny glands on petioles (violet); cauline leaves 2 (coefficient of leafiness 0.06), lower leaf short-petiolate, broadly lanceolate (3.2:1), acuminate, upper one linear, acuminate (14:1), both without stellate pubescence. Inflorescence openly paniculate, with 6–7(10) capitula; peduncles slender, with 3–5 bracteal leaves with sparse hairs 1.5 mm long and glands 0.3 mm long, scatteredly stellate-hairy. Involucres 10–10.5 mm long, ovate; involucre bracts almost 3-seriate, lanceolate, subacute, dark green, inner ones with pale border, with sparse (14) hairs 1–1.5(–2) mm long and scattered (40) glands 0.3–0.4 mm long, sparsely stellate-pubescent, tip barbate; stigmas yellow, subsequently darkening; habit reminiscent of *H. murorum* L. s. l. Flowering July to August.

Can be found in Western Transcaucasia. *General distribution*: Balkans-Asia Minor. Endemic. Described from the former Olta District. Type in Tbilisi.

77. **H. insolitum** Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 32; in Pflzr. IV, 280, 1044.

- 74 Perennial. Stem 25–40 cm high, to 2.5 mm in diameter, sulcate, with occasional hairs at base, stellate-hairy above. Basal leaves 3–5, obovate or oblong, inner with long base tapered to petiole, often toothed and with teeth on petioles, glabrous above, with sparse hairs (or also glabrous) beneath, along midrib and margin with single hairs 0.5–2 mm long, along midrib barely stellate-hairy; cauline leaves 2 (coefficient of leafiness 0.06), lower short-petiolate, lanceolate, with abruptly narrowed base, hastate, with 1–2 large, falcate teeth, upper linear. Inflorescence furcate-paniculate, with 3–10 capitula, partly undeveloped; peduncles sparsely hairy (or glabrous), equally glandular, glands 0.2–0.3 mm long, scatteredly stellate-hairy. Involucres 10–12 mm long, ovate, later truncate; involucre bracts green-black, lanceolate, outer ones short, narrow, loose, others acute, very sparsely (1s and 2s) hairy with short hairs 1 mm long; with scattered (30), with glandular hairs 0.4 mm long, glands 0.4 mm long, hardly stellate-hairy; stigmas darkish; by habit and form of leaves reminiscent of *H. bifidum* Kit., by involucres, *Pseudostenotheca*. Flowering July to August.

Can be found in Western Transcaucasia.—*General distribution*: Balkans-Asia Minor. Endemic. Described from former Artvin District. Type in Tbilisi.

78. **H. artabirens** Zahn in Pflzr. IV, 280 (1922) 1038.

Perennial. Stem 30–70 cm high, 2–3 mm in diameter, at base reddish-violet, short-pilose, in upper part slightly glandular and sparsely stellate-hairy. Basal leaves 2–5, to 10 cm long (3:1), ovate-lanceolate,

with truncate base or abruptly narrowed to winged petiole, with scattered short teeth (less often with large teeth), both sides with occasional, short (0.5–1 mm long) hairs or glabrous, along midrib beneath densely (30) hairy, hairs 1.5 mm long, stramineous-green, lighter beneath; cauline leaves (1)–2–3(–4) (coefficient of leafiness 0.05), elliptical-lanceolate, at base lamina abruptly narrowed to petiole, often with large, acute teeth. Inflorescence openly paniculate, with 2–12(–25) capitula; peduncles without hairs or with occasional, light-colored hairs 1 mm long, with scattered glands 0.3 mm long, more or less tomentose. Involucres 9–12(–13) mm long; involucre bracts lanceolate, obtuse, with reddish tips, without hairs or with occasional (2), hairs 1 mm long, moderately (50) glandular with glands 0.5 mm long, at base slightly stellate-hairy. Stigmas dark. In habit resembles *H. diaphanoides*. Flowering July to August.

Montane broad-leaved and spruce forests. Can be found in Western Transcaucasia. *General distribution*: Balkans-Asia Minor (former Olta District). Described from Greece? Type unknown.

- 75 79. ***H. variegatisquamum*** Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 31; Pflzr. IV, 280, 1040.

Perennial. Stem 35 cm high, slender, somewhat hairy, with stellate hairs above. Basal leaves oblong or oblong-lanceolate, subobtusely or acuminate with abruptly or gradually tapered base, short-toothed or at base with more or less conspicuous teeth, almost glabrous and bluish-green above with occasional glands along margin, petioles and midrib beneath, lighter and violet beneath (together with petioles); cauline leaves 1(–2) (coefficient of leafiness 0.04), oblong or lanceolate (to linear). Inflorescence paniculate, with 3–8(–12) capitula; peduncles scatteredly hairy, almost without glands, grayish-tomentose. Involucres 9–10 mm long, ovate, involucre bracts linear-lanceolate, acute, dark green, more or less without hairs, moderately glandular, with dense stellate hairs along margin to tip. Stigmas yellowish-brown, later turning dark. In habit resembles *H. murorum* L. s. l. Flowering July to August.

Montane pine forests. Can be found in Western Transcaucasia. *General distribution*: Balkans-Asia Minor. Described from the former Olta District. Type unknown.

Note. It is distinguished from the closely related species *H. amphitephrodes* Sosn. and Zahn by a lower coefficient of leafiness, oblong leaves, and in an almost complete absence of glands on the peduncles but a well-developed pubescence.

80. ***H. albellipes*** Schelk. and Zahn in Izv. Kavk. Muzeya, VII (1912) 139; Zahn in Pflzr. IV, 280, 1037.

Perennial. Stem 35–60 cm high, 2.5 mm in diameter, at base with sparse, white hairs 2.5 mm long, stellate-hairy (to middle of stem), slightly glandular. Basal leaves 6, ovate or ovate-lanceolate, more or less abruptly narrowed to petiole (3.6:1), distinctly (5–7) acute-toothed, more or less without hairs above, with few hairs 1 mm long, beneath and along margin, beneath on midrib, hairs dense (16–26), 1.5 mm long (basal and cauline leaves equally hairy); cauline leaves 1–4 (co-efficient of leafiness 0.05), ovate-lanceolate, abruptly narrowed to petiole, at base often deeply (1–2) toothed, acuminate, with stellate pubescence beneath. Inflorescence corymbose-panicle, with 3–25 capitula; peduncles without hairs or moderately hairy, with glands 0.4–0.8 mm long, white-tomentose. Involucre 10–11 mm long; involucre bracts linear-lanceolate, more or less acute, greenish, without hairs, with dense 70(50–80), long and thin (up to 1.5 mm long) glands, more or less without stellate hairs. Stigmas dark. Flowering July to August.

Subalpine and alpine meadows, at 2100–2400 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Svanetia. Type in Tbilisi.

Note. In all characters it is close to *H. erythrocarpoides* Litw. and Zahn, from which it is distinguished only by the distinctly hairy base of the stem.

81. ***H. erythrocarpoides*** Litw. and Zahn in Fedde, Repert. IV (1907)
76 249; Zahn in Pflzr. IV, 280, 1037.

Perennial. Stem 35–60 cm high, to 2 mm in diameter, sometimes 2, with solitary hairs 1.5–2.5 mm long and occasional glands below inflorescence, slightly stellate-hairy. Basal leaves 4–8, ovate or elliptical, inner leaves oblong-lanceolate, to 14 cm long (4.5:1), more or less abruptly narrowed to long petiole, spiny, finely toothed or with large, triangular, long teeth at base of lamina (var. *triangulidens* Zahn), more or less glabrous above, with scattered (11.14) hairs 1 mm long beneath, along midrib hairs dense (24–30), 1–1.5(–2.5) mm long, along margin scattered (10), 0.7 mm long, with occasional tiny glands along margin, olive-green, paler beneath; cauline leaves 1–2 (coefficient of leafiness 0.14), lanceolate, tapered to petiole, acuminate, finely serrate, more or less glabrous, upper leaf linear-lanceolate, with stellate hairs beneath. Inflorescence corymbose-panicle, with (2)5–15(–20) capitula; peduncles slender, without hairs, with sparse 0.5 mm long glands, moderately stellate-hairy. Involucres 9–11 mm long, cylindrical-ovate, later truncate; involucre bracts 2–3-seriate, dark, outer short (4–6 mm), inner longer (10 mm), from lanceolate base tapered into somewhat obtuse tip, without hairs, but with dense (80–90) glands 0.5–0.8 mm long; outer

bracts weakly stellate-hairy. Stigmas dark. Achenes initially reddish-brown, later dark gray, 4 mm long. Flowering July to August.

Subalpine belt, in pine and spruce forests, to 2300 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from Teberda. Type in Tbilisi.

Note. Var. *triangulidens* Zahn was described from Abkhazia (Avchavchara) in *Vestn. Tifl. Bot. Sada*, 12 (1908) 10.

Section 4. *Clauciformia* Freyn in Velen. Fl. Bulg. (1891) 347; Zahn in Pflzr. IV, 280, 35, 970; Zahn in Asch. and Graebn. Synopsis, XII, III, 577.—In habit plants resemble those of section *Glauca*, but leaves are broader, covered, particularly along margin, with quite long (to 20 mm) silvery bristles, dark bluish-green; achenes whitish or yellowish; stigmas yellow; inflorescence with glands.

Note. A Balkans-Asia Minor section. The type of the section—*H. stuposum* Rchb., is not found in our country, but a species approaching section *Italica*—*H. olympicum* Boiss., somewhat was found in southern Transcaucasia (former Kars Region).

82. ***H. olympicum*** Boiss. Diagn. I, 4 (1842) 30; Fl. or. III, 875; Zahn in Pflzr. IV, 280, 970; Asch. and Graebn. Synopsis, XII, III, 587; Grossh; Fl. Kavk. IV, 273.

- 77 Perennial. Stem 30–80 cm high, densely (particularly at base) covered with long (8–20 mm) hairs, somewhat stellate-hairy above. Basal leaves absent at anthesis, but lower cauline leaves often crowded, forming pseudorosette; leaves 12–20 (coefficient of leafiness 0.30), lower large, to 20 cm long, oblong- or ovate-lanceolate, tapered to petioles, acuminate, scatteredly finely toothed or hairy along margin (rarely more or less conspicuously toothed), on both sides scatteredly covered with bristles 3–6 mm long, but densely hairy along margin and midrib beneath, with white, bristles to 10 mm long; upper leaves smaller narrowly lanceolate, with very long (to 20 mm) bristles along margin; all leaves bluish-green, paler beneath, sometimes reddish-violet; leaves gradually passing into bracts. Inflorescence corymbose-panicle, with 4–8 (rarely more) capitula; peduncles gray from stellate hairs, almost without glands, but more or less densely covered with long bristles. Involucres 12–15 mm long; involucral bracts broad, obtuse (inner acute), sparsely hairy, without or with occasional, tiny glands and mostly densely stellate-hairy (cusp bearded). Stigmas yellow. Achenes pale, 3.2–4 mm long. Flowering July to September.

Middle mountain zone on rocks.—*Caucasus*: Southern Transcaucasia. *General distribution*: Balkans-Asia Minor. Described from Olympus. Type in Geneva.

Section 5. Foliosa Peter in Pflanzenfam. IV (1894) 384; Zahn in Pflzr. IV, 280 (1921) 36, (1922) 935; in Asch. and Graebn. Synopsis, XII, III, 526.—In habit plants resemble broad-leaved *H. umbellatum*, but in all parts entirely (or almost) without stellate hairs; leaves dark bluish-green, along margin more or less setaceous, with reticulate venation beneath, middle and upper leaves slightly amplexicaul. Plants of steppe provinces.

1. Plants without stellate hairs in all parts; leaves bluish-green, with conspicuous reticulate venation beneath.....83. **H. virosum** Pall.
- + At least peduncles scatteredly stellate-hairy; leaves weakly bluish-green, with inconspicuous reticulate venation beneath, sometimes slightly arachnoid-tomentose.....84. **H. robustum** Fr.

83. **H. virosum** Pall. Reise. I (1771) 501; Ldb. Fl. alt. IV, 136; Fl. Ross. II, 856; Froel. in DC. Prodr. VII, 226; Fr. Symb. 194; Epicr. 125; Turcz. Fl. baic.-dahur. II, 174; Schmalh. Fl. II, 161; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1106; Grossh. Fl. Kavk. IV, 272; Zahn in Pflzr. IV, 280, 935; in Asch. and Graebn. Synopsis, XII, III, 526; Krylov, Fl. Zap. Sib. XI, 3062, nec Arv.-Touv. (1876), nec Gren. and Godr. (1850).—*H. sabaudum* Pall. Reise, II (1773) 297, III (1776) 314; M.B. Fl. taur.-cauc. II, No. 1614.—*H. prostratum* Ldb. Fl. Ross. II (1844) 856.—*H. foliosum* W. and K. Pl. rar. Hung. II (1802) 78 No. 155, t. 145; M.B. Fl. taur.-cauc. III, 575; Fl. Epicr. 126; Boiss. Fl. or. III, 878.—**lc.**: Rchb. Ic. XIX, 85, t. 175.—**Exs.**: Fries, Herb. norm. fasc. XII, No. 10; GRF Nos. 1333, 2096, 2097, 2249, 2250; Callier, Iter. Taur. tert. No. 669 (1900).

Perennial. Rhizome short, densely covered with thick fibers; stem 30–120 cm high, erect, thick (2–8 mm in diameter), usually violet below and more or less densely covered with remote, stiff hairs 1.5–3 mm long, in upper parts glabrous or whole stem smooth, copiously producing latex. Basal and often lower cauline leaves absent at anthesis; cauline leaves numerous, 20–110, more or less equidistant entire length of stem up to tip (coefficient of leafiness to quite high—0.40–1.30), ovate (var. *latifolium* Trautv.) to lanceolate (var. *oblongifolium* Froel.), to 14 cm long, from very broad (2:1) to oblong (5:1), sessile, with broadly cordate base, amplexicaul (at least in middle and upper leaves), entire or somewhat sinuate-toothed, sometimes undulate (var. *undulatifolium* Trautv.), hairy on both sides or also along margin beneath or only along margin (hairs up to 2.5 mm long), less often entirely glabrous, dark bluish-green, paler beneath and with clear reticulate venation. Inflorescence paniculate or corymbose-panicle, with 6–150 capitula; peduncles thick above, glabrous. Involucres 8–10 mm



Plate V.

H. caucasiense Arv.-Touv.

long; involucre bracts appressed, linear, obtuse, glabrous, light green to blackish-green (var. *nigrum* Rupr.). Florets yellow; stigmas yellow or (rarely) somewhat brownish. Achenes 3–4 mm long, dark brown. Flowering July to September (October). (Plate XI, Fig. 1.)

Steppes, steppe-meadows, steppe-forests zones, thin oak forests, meadow and rocky mountain slopes.—In all chernozem-steppe districts: European part, Caucasus, Eastern and Western Siberia and Central Asia; *Far East*: Zeya-Bureya, Uda region, Ussuri. *General distribution*: Central Europe (eastern part), Balkans-Asia Minor, Armenia-Kurdistan, Iran, Indo-Himalayas, Dzhungaria-Kashgaria, Mongolia, Japan, China (western part). Described from lower reaches of Volga and Yaik rivers (D. Litvinow in schedis). Type in Leningrad?

84. **H. robustum** Fr. Symb. (1848) 193; Epicr. 127; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1106; Zahn in Pflzr. IV, 280, 938; in Asch. and Graebn. Synopsis, III, 527; Grossh. Fl. Kavk. IV, 273, nec Martr. (1867).—*H. largum* Fr. Epicr. (1862) 127.—*H. latifolium* Ldb. Fl. Ross. II (1844–1846) 854.—*H. pallonianum* Zahn in Sched. GRF No. 1826; in Pflzr. (l. c.).—**Exs.**: GRF No. 1826; Zahn. Hier. Europ. Nos. 938, 939; Dorfler, Herb. norm. No. 4349 (sub *H. virosum* Pall.).

Perennial. Stem (40–)70–150 cm high, thick, tough, often with stiff
81 hairs, stellate hairs in inflorescence, without glands. Basal leaves absent at anthesis; cauline leaves numerous, 25–85 (coefficient of leafiness 0.35–0.80), dark bluish-green, with inconspicuous reticulate venation beneath, ovate to lanceolate, sessile, with ovate uniformly broad or somewhat narrowed base often toothed, more or less glabrous or with occasional hairs along margin, upper leaves more or less stellate-hairy beneath. Inflorescence umbellate or umbellate panicle, with 4–50 capitula; peduncles thick above, without hairs and glands but more or less conspicuously stellate-hairy. Involucre 9–11 mm long; involucre bracts somewhat broad, obtuse, green, outer slightly divergent, without hairs and glands (sometimes with occasional glands), but stellate-hairy at base. Florets golden yellow; stigmas yellow. Achenes dark brown. Flowering July to August.

Steppe regions, on sunny slopes, in scrubs apparently wherever *H. virosum* grows.—*European Part*: Volga-Kama, Middle Dnieper, Volga-Don, Black Sea Region, Lower Don, Lower Volga; *Caucasus*: All districts; *Western Siberia*: All districts; *Eastern Siberia*: Angara-Sayans, Dauria, Lena-Kolyma; *Far East*: Zeya-Bureya, Ussuri; *Soviet Central Asia*: All districts. *General distribution*: Central Europe (eastern part); Balkans-Asia Minor, Armenia-Kurdistan, Iran, Indo-Himalayas, Dzhungaria-Kashgaria, Japan, China (western part). Described from Kursk Region. Type in Uppsala?

Note. According to Zahn, it is an intermediate species between *H. virosum* and *H. umbellatum* (hybrid?). Besides, an intermediate form between *H. robustum* and *H. umbellatum* has been found in Siberia, which Zahn called var. *subpallonianum* Zahn.

H. largum Fr., *H. pallonianum* Zahn, and *H. turanicum* Zahn are also included here as subspecies.

Section 6. *Sabauda* Fr. Epicr. (1862) 117; Peter in Pflanzenfam. IV, 5, 384; Zahn in Pflzr. IV, 280 (1921) 36, (1922) 942; in Asch. and Graebn. Synopsis, XII, III, 529.—Plants robust, (30–)50–120 cm tall, thick and sturdy, stem woody at base, often colored and covered with stiff hairs. Basal leaves withering before anthesis; cauline leaves numerous, 10–15 (coefficient of leafiness 0.30–0.80), evenly distributed, lower with tapered base, others sessile, lanceolate, without reticulate venation, often with tiny glands along margin. Inflorescence openly paniculate, often occupying to 1/3 of stem, with 3–30 capitula, partly undeveloped; peduncles more or less stellate-hairy. Involucral bracts appressed (without recurved cusps), imbricate, all obtuse, mostly dark, weakly hairy and glandular, or only glandular, or more or less glabrous. Stigmas dark (very rarely yellow); ligulate florets without cilia. Achenes dark brown to black, 3.5 mm long, margin of receptacular alveoli long fimbriate-toothed. Late flowering plants.

Note. The members of section *Sabaude* are distributed mainly in Central Europe and partly in the Atlantic Europe, Mediterranean, and Balkans-Asia Minor regions. (They are absent in the extreme northern and southern parts; in most parts of England, Sardinia, Sicily, Greece, Scandinavia and the eastern half of the European Part of the Soviet Union.) In the USSR they are comparatively rare and are found only in the western and southern regions: Ladoga-Ilmen (southern part), Baltic region (southern part), Upper Dnieper, Middle Dnieper, Bessarabia, Black Sea Region (?), Crimea, Caucasus. The type species of the section, *H. sabaudum* L. (synonym *H. boreale* Fr. p. p., *H. rigidum* Hartm., *H. autumnole* Gris.), does not grow in our country, and the plants reported in the literature under this name belong to other species of this section. Similarly, references to the occurrence of this species in the eastern regions of the European Part of the Soviet Union are based on incorrect identifications; often *H. virosum* or broad-leaved forms of *H. umbellatum* are mistaken for *H. sabaudum* s. l.

1. Involucres and peduncles with (long) hairs and glands leaf margin with tiny glands.....85. ***H. scabiosum*** Sudre

- + Involucres and peduncles with glands only (often very small), without hairs (or with solitary hairs) or eglandular and glabrous, leaf margin more or less without tiny glands.....2.
- 2. Stigmas yellow.....3.
- + Stigmas dark.....5.
- 3. Involucral bracts eglandular.....86. *H. praticola* Sudre
- + Involucral bracts with glands.....4.
- 4. Leaves very broad (2:1).....87. *H. auratum* Fr.
- + Leaves narrower (4:1).....92. *H. vasconicum* (Jord.) Zahn
- 5. Involucral bracts eglandular.....6.
- + Involucral bracts more or less with dense glands.....7.
- 6. Middle cauline leaves narrowed toward base to petiole.....88. *H. sublactucaceum* Zahn
- + Middle cauline leaves with rounded base.....89. *H. vagum* Jord.
- 7. Leaf margin entire.....90. *H. virgultorum* Jord.
- + Leaves conspicuously (to coarsely) toothed.....91. *H. lugdunense* Rouy.

Subsection I. Autumnalia Juxip (Grex *H. autumnale* Z. in Asch. and Graebn. Synopsis, XII, III (1938) 532.—Grex *H. sabaudum* Z., in Pflzr. IV, 280 (1922) 944.—Involucral bracts and peduncles with long hairs and glands; stem at base or to tip covered with stiff hairs; leaf margin with scattered or sparse glands; stigmas dark.

Cycle 1. Obliqua Juxip.—Glands on involucres and often also peduncles exceeding number of hairs, or hairs very few; stem entirely hairy (often with stiff hairs); middle cauline leaves with more or less tapered base and entire or slightly toothed margin.

- 83 85. *H. scabiosum* Sudre in Bull. Assoc. pyren, (1899) 250; Hier. du Centre de la France, t. III, 19; Zahn, Hier. Schweiz, 529; Zahn in Pflzr. IV, 280, 947; in Asch. and Graebn. Synopsis, XII, III, 539.—**Ic.:** van Soest in Nederl. Kruidkund. Archief, IV (1929) 140 (210), fig. 55.—**Exs.:** Petrak, Fl. bohem. et morav. exs. No. 1198.

Perennial. Stem 50–120 cm high, very densely covered with stiff hairs in lower half, less densely above. Cauline leaves 30–50 (coefficient of leafiness 0.50), dark green above, lighter or violet beneath, oblong to ovate-lanceolate, lower often very large, more or less glabrous above (except lowermost), quite densely stiff-hairy beneath, middle with somewhat tapered base, upper with ovate-rounded base, almost all leaves with entire or slightly (spinescently) toothed margin. Inflorescence umbellate panicle, compact, usually with few capitula

(-10); peduncles with many bracteal leaves, very sparsely covered with hairs to 2 mm long and occasional or scattered glands. Involucres 10-13 mm long, blackish; involucral bracts obtuse, very sparsely or scatteredly (less often moderately) hairy and with single or few glands, scarcely or more or less conspicuously stellate-hairy. Flowering September to October.

Edges of large forests, on rocky foothill slopes.—*European Part*: Upper Dniester, Baltic Region (south); *Caucasus*: Western Transcaucasia (Batumi). *General distribution*: Central Europe, Mediterranean, Balkans-Asia Minor. Described from France. Type unknown.

Subsection 2. Borealia Juxip.—(Grex *H. boreale* Fr.) Zahn in Pflzr. IV, 280 (1922) 948; in Asch. and Graebn., Synopsis, XII, III, 532.—Involucres only with short glands, without hairs, or with very sparse, short hairs, or entirely without glands and hairs; peduncles almost always glabrous and eglandular; stem more or less with stiff or soft hairs only in lower part, almost glabrous above; leaf margin usually eglandular; stigmas dark, rarely yellow.

Cycle 2. Aurata Juxip.—Involucral bracts glabrous; stigmas yellow.

86. **H. praticola** Sudre, Hier. du Centre de la France, t. III (1902) 30; Zahn in Pflzr. IV, 280, 955; in Asch. and Graebn. Synopsis, XII, III, 562.

Perennial. Stem 50-100 cm high, in lower third more or less hairy. Cauline leaves 25-45 (coefficient of leafiness 0.50), oblong or broadly lanceolate (lowermost large), gradually decreasing upward, acuminate, finely or prominently serrate, upper ovate-lanceolate, with more or less cordate or ovate base, plicate or twisted at tip; all leaves more or less glabrous or slightly hairy and with stellate hairs only along margin and midrib beneath. Inflorescence quite open, umbellate panicle, with 4-10(-38) capitula; peduncles long. Involucres (9-)10-11.5 mm long; involucral bracts green or blackish, obtuse, more or less eglandular and glabrous (rarely occasional hairs at base later), and without stellate hairs; stigmas yellow; resembling *H. vagum* Jord. in general habit. Flowering September to October.

Edges of deciduous forests, on foothill slopes.—*Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Mediterranean, Balkans-Asia Minor. Described from France. Type unknown.

87. **H. auratum** Fr. Symb. (1848) 181; Epicr. 124; Zahn in Pflzr. IV, 280, 955; in Asch. and Graebn. Synopsis, XII, III, 562; non Godr. (1857),

nec Lange (1880), nec Lint. (1905).—*H. quercetorum* Jord. in Bot. 3, II (1857) 386.—**lc.**: van Soest in Nederl. Kruidkund. Archief, II (1926), fig. 48.

Perennial. Stem 60–120 cm high, in lower part somewhat hispid, stellate-hairy above. Cauline leaves numerous, 20–33 (coefficient of leafiness 0.30), lower oblong-lanceolate, with somewhat tapered base, middle broad (1.5–3:1), lanceolate to oval, somewhat tapered to base or sessile with rounded or more or less cordate base, with short and acute teeth, with prominent veins beneath, more or less stellate-hairy, dark green, often violet beneath. Inflorescence umbellate panicle, with 10–20 capitula; peduncles almost tomentose, without or with quite scattered hairs and glands. Involucres 8–11 mm long; involucre bracts obtuse, blackish, without simple and stellate hairs, with sparse 20(13–26), glands 0.2–0.4 mm long, Stigmas yellowish-brown. Flowering September to October.

Edges of deciduous forests, along slopes of foothills.—*European Part*: Crimea; *Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Uppsala (from cultivated specimen). Type unknown.

Cycle 3. Vaga Juxip.—Stigmas dark; involucre bracts eglandular.

88. **H. sublactucaceum** Zahn in Koch, Synopsis, 3, II (1901) 1917; in Pflzr. IV, 280, 954; Asch. and Graebn. Synopsis, XII, III, 557.—*H. boreale* β . *lactucaceum* Griseb. Comm. (1852) 54, p. p.—**lc.**: Zahn in Pflzr. fig. 67.—**Exs.**: Petrak. Fl. bohém. et morav. exs. No. 1199.

Perennial. Stem 50–120 mm high, at base more or less densely hairy. Cauline leaves 30–40 (coefficient of leafiness 0.40), large, lower (and partly middle) broadly (to narrowly) lanceolate, more or less long-petiolate, acute (middle leaves often crowded); all leaves with small or 2–4 large teeth; upper leaves ovate-lanceolate, sessile, with slightly tapered base, all leaves light green, lustrous above, pale or colored beneath. Inflorescence paniculate. Involucres 9–10(–12) mm long; involucre bracts subobtuse, dark green, eglandular or glabrous. Stigmas dark. Flowering September to October.

85 Edges of oak and chestnut forests.—*Caucasus*: Western Transcaucasia. *General distribution*: Central Europe. Described from Central Europe (Grisebach). Type unknown.

Note. This description is based on the incomplete and unsatisfactory diagnosis; perhaps we should describe our Caucasian species as an altogether separate species, considering its geographic isolation.

89. **H. vagum** Jord. Cat. Gren. (1849) 21; Boreau, Fl. du Centre de la France, ed. 3, II, 388; Zahn in Pflzr. IV, 280, 953; in Asch. and Graebn. Synopsis, XII, III, 552.—*H. nemorosum* Dierb. Fl. Heidelb. II (1820) 252.—**lc.**: Hegi, Ill. Fl. VI, 2 (1929) 1340, fig. 946.

Perennial. Stem 30–100 cm high, at base more or less (sometimes densely and stiffly) hairy, almost glabrous above. Cauline leaves numerous, 10–50 (coefficient of leafiness 0.30–0.50), evenly distributed (or in middle crowded), lower to 20 cm long, broadly lanceolate, with somewhat tapered base, middle elliptical-lanceolate, with rounded base, sessile, acuminate, upper ovate, small small; all leaves mostly slightly, irregularly and finely (less often conspicuously) toothed, more or less glabrous above, dark green, lustrous, usually stiff (shade leaves soft, delicate), along margin and beneath near base more densely hairy. Inflorescence paniculately umbellate, with long branches, 3–30 (and more) capitula; peduncles somewhat thickened upward, with apical leaves transitional to outer, lax involucre bracts. Involucres 9–12 (–13) mm long; involucre bracts dark green to black, eglandular (or only with scattered glands), without simple hairs and stellate hairs. Stigmas dark. Flowering September to October.

Edges of deciduous forests, scrubs, rocky slopes of foothills, subalpine meadows.—*European Part*: Ladoga-IImen (south), Baltic Region, Upper Dniester, Bessarabia, Crimea; *Caucsus*: Eastern and Western Transcaucasia, Talysh. *General distribution*: Central Europe, Mediterranean, Balkans-Asia Minor (northern part). Described from France. Type in Lyons.

Note. It is the most widespread species of this section.

Cycle 4. Virgultora Juxip.—Stigma dark; involucre bracts with glands.

90. **H. virgultorum** Jord. Cat. Dijon (1848) 27; Boreau, Fl. du Centre de la France, ed. 3, II, 385; Zahn in Pflzr. IV, 280, 949; in Asch. and Graebn. Synopsis, XII, II, 545.—*H. silvestre* Tausch in Flora, XI (1828) Erg.-Bl. 70, p. p.—**lc.**: Pflzr. IV, 280, p. 980, fig. 67.—**Exs.**: GRF Nos. 725, 2242; Baenitz, Herb. Europ. Nos. 146, 6641.

Perennial. Stem 60–120 cm high, soft-pubescent below (hairs 2–4 mm long), more or less glabrous above. Cauline leaves 25–50 (coefficient of leafiness 0.40), lower broadly ovate-lanceolate, narrowed to both ends (lowest elliptical-lanceolate to obovate, usually withering before anthesis), middle broadly ovate, sessile with rounded base, upper oval, acuminate, all leaves more or less entire or slightly
86 denticulate, dark green, more or less glabrous above, scatteredly soft-hairy beneath (along midrib and margin). Inflorescence paniculately

umbellate, with 3–30 capitula; peduncles stellate-hairy, almost always without hairs and glands (sometimes with occasional hairs and glands). Involucres (9–)10–11 mm long; involucral bracts very broad, obtuse, dark green or blackish almost exclusively with scattered (f. *puhringii* m.), moderate (f. *schmalhauseni* m.) or dense (f. *zinserlingii* m.) tiny glands, less often with single hairs and glands. Stigmas dark. Flowering September to October. (Plate XII, Fig. 1.)

Edges of forest, mostly deciduous forests, scrubs rocky mountain, slopes.—*European Part*: Ladoga-Ilmen (south), Baltic Region (south), Upper Dniester, Upper Dnieper, Bessarabia, Crimea; *Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Mediterranean, Balkans-Asia Minor. Described from France. Type in Lyons.

91. **H. lugdunense** Rouy, Fl. France, IX (1905) 388 sub *H. virgultorum*; Zahn in Fl. Pflzr. IV, 280, 948; in Asch and Graebn. Synopsis, XII, III, 542.—*H. eminens* Sudre, Hier. du Centre de la France, t. V (1902) 25.—*H. eminulum* Sudre, in Bull. Ac. geogr. bot. (1913) 11.

Perennial. Plant robust; stem thick, glabrous above. Cauline leaves numerous, evenly distributed, lower large, elliptical to ovate-lanceolate, tapered toward both ends, middle to broadly ovate-lanceolate (2:1), sessile, with rounded base, upper oval, short-acuminate; all leaves distinctly serrate. Inflorescence paniculate, with long, small-leaved branches; peduncles without hairs and glands (or with sparse tiny glands), with many bracteal leaves transitional to involucral bracts. Involucres 10–12 mm long; involucral bracts obtuse, slightly stellate-hairy, densely glandular, without simple hairs (or with occasional hairs). Stigmas dark; florets sometimes tubular. Flowering September to October.

Edges of deciduous forests.—*European Part*: Upper Dniester (Lvov). *General distribution*: Central Europe, Mediterranean, Balkans-Asia Minor (Balkans). Described from France. Type in Paris.

Subsection 3. Laurina Juxip.—*H. laurinum* Arv.-Touv. Add. a Mon. (1879) 18; Zahn in Pflzr. IV, 280, 926; in Asch. and Graebn. Synopsis, XII, III, 510.—Resembling *H. umbellatum* in general habit but with glandular involucral bracts, usually without hairs; leaves sessile with more or less broad base; stigmas dark.

Cycle 5. Vasconica Juxip.—Subgrex *H. vasconicum* (Jord.) Zahn in Engl. Pflzr. IV, 280 (1922) 926.—Cauline leaves 25–40.

92. **H. vasconicum** (Jord. ined.) Zahn, Hier. Alp. mar. (1916) 337; in Pflzr. IV, 280, 926; in Asch. and Graebn. Synopsis, XII, III, 511.—**lc.**: van Soest in Nederl. Kruidkund. Archief, IV (1929), fig. 56.

Perennial. Stem (30–)50–90 cm high, at base colored and somewhat
87 hairy, glabrous above. Basal leaves withering before anthesis; cauline leaves (25–)30–40 (coefficient of leafiness 0.50), oblong- or ovate-lanceolate, tapered toward base (4:1), sessile, gradually or abruptly reduced upward, irregularly finely serrate, acuminate, glabrous (or to moderately hairy) above, sparsely to densely hairy beneath (often only along midrib), upper leaves without simple hairs, stellate-hairy, light green (or colored beneath). Inflorescence paniculately umbellate, with 10–20 capitula, in part undeveloped; peduncles slender, (almost) without hairs, but often with occasional or few tiny glands, grayish-tomentose. Involucres 9–11(–12) mm long, ovate; involucre bracts obtuse, green outer loose, without hairs, with moderate to dense (50–80), tiny glands, 0.1–0.3 mm long (almost) without stellate hairs. Stigma yellow. Flowering August to September.

European Part: Crimea. *General distribution:* Central Europe, Mediterranean, Balkans-Asia Minor (western part). Described from southern France. Type in Lyons.

Section 7. Umbellata Fr. Epicr. (1862) 132 p. p.; Peter in Pflanzenfam. IV, 375; Zahn in Pflzr. IV, 280 (1921) 35, (1922) 907; in Asch. and Graebn. Synopsis, XII, III, 491.—*Foliosa* Lbg. in Hartm. Handb. 11 (1879) 57.—Inflorescence umbellate or paniculate; involucre bracts more or less regularly imbricate, multiseriate, outer remote or recurved, obtuse; leaves numerous, usually evenly distributed, uniform in shape, sessile, more or less without or with tapered base; achenes brownish-black; leaves and peduncles arachnoid or tomentose.

Note. By restricting ourselves to the descriptions of only the three phylogenetic series below, we are not implying by any means that the members of this section represent a homogenous group. This is contradicted by both the morphological differences among them and the wide range (circumboreal). However, a detailed treatment of the extensive material collected thus far would have delayed completion of our work for years. Hence, we had to refrain from such a study and confine ourselves to only a general review. The direction for future research has been set forth by us in the form of a work plan, published in our paper "On the systematics of the aggregate species *H. umbellatum* L." (*Yubil. Sb. Obshch. Estestvoisp. pri AN ESSR*, 1953, 187).

KEY TO SUBSECTIONS AND CYCLES OF SECTION UMBELLATA

1. Plants (stem, leaves) conspicuously or densely hairy (mainly in lower half), usually with high coefficient of leafiness and xeromorphic characters.....Subsection 1. **Hirsuta** Juxip...2.
- + Plants almost glabrous, i.e., without conspicuous, more or less long hairs, but with broken hairs, making plants more or less scabrous to touch (shade specimens glabrous).....Subsection 2. **Eu-umbellata** (Zahn) Juxip...4.
2. Stem more or less conspicuously leafy (coefficient of leafiness 0.25–0.40).....Cycle 1. **Eu-hirsuta** Juxip...4.
- + Stem densely to very densely leafy (coefficient of leafiness 0.65–0.90).....3.
3. Peduncles and involucre bracts without hairs and glands.....Cycle 2. **Hirsutissima** Juxip
- + Peduncles and involucre bracts densely covered with erect, stiff bristles; involucre bracts also with tiny glands.....Cycle 3. **Eurobaltica** (Zahn) Juxip
4. Stem densely or very densely leafy.....5.
- + Stem more or less conspicuously leafy (coefficient of leafiness 0.25–0.40); plants tall.....Cycle 4. **Extensifoliata** Juxip
5. Stem densely leafy (coefficient of leafiness 0.40–0.75); *H. umbellata typica*.....Cycle 5. **Densifoliata** Juxip
- + Stem very densely leafy (coefficient of leafiness 0.75–0.90 (1.20)).....Cycle 6. **Dunales** Juxip

* * *

1. Peduncles and involucre bracts densely covered with stiff hairs.....93. **H. gynaeconesaeum** Juxip
- + Peduncles and involucre bracts without hairs and glands.....2.
2. Stem and leaves densely hairy.....94. **H. subhirsutissimum** Juxip
- + Stem and leaves without hairs (or only scabrous from broken hairs).....95. **H. umbellatum** L.

Subsection 1. Hirsuta Juxip.—Plants (stem and leaves) clearly or even densely hairy (lanate); usually with high coefficient of leafiness and xeromorphic characters.

Cycle 1. Eurobaltica Juxip.—Grex *H. eurobalticum* Zahn in Pflzr. IV, 280 (1922) 915; Asch. and Graebn. Synopsis, XII, III, 504.—Ic.: van Soest in Nederl. Kruidkund. Archief, II (1926), fig. 45.—Peduncles and involucre bracts densely covered with stiff hairs; involucre bracts also with tiny glands.

93. **H. gynaeconesaeum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 470.

Perennial. Stem 50–60 cm high, sturdy, 3 mm in diameter, to top, particularly in lower third densely covered with hairs to 5 mm long. Cauline leaves 40–50 (average coefficient of leafiness 0.80); leaves to narrowly lanceolate (9:1), lower with 1–3 small teeth, conspicuously hairy beneath along margin and midrib, upper with entire margin, without hairs. Inflorescence unbellate, with 13–20 capitula; peduncles densely covered with stiff, remote, spiny (1.5 mm long) hairs, tomentose. Involucres 10 mm long; involucre bracts with quite dense, short (0.5 mm long) hairs and moderate glands 0.1 mm long, without stellate hairs. Flowering August to September.

Along dunes.—*European Part*: Baltic Region (Naissar (Nargen) near Tallin). Endemic. Described from vicinity of Tallin. Type in Tartu.

Note. The species belonging to the series *Eurobaltica* represent a dune element and are distributed along the seacoast from Holland to Sweden. *H. gynaeconesaeum* Juxip represents perhaps the extreme northeastern point of distribution of species of this series, although Zahn indicates that their range extends to Siberia (along the shores of the Arctic Ocean). However, we could not find them in the Herbarium of the Botanical Institute of the Academy of Sciences of the USSR. This species is distinguished from all the species of section *Umbellata* known to us by having peduncles that are densely covered with spiny hairs.

Cycle 2. Hirsutissima Juxip.—Peduncles and involucre bracts glabrous and eglandular, but stem and leaves densely pubescent.

94. **H. subhirsutissimum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 470.

Perennial. Stem 25–70 cm high, 1.5–2.5 mm in diameter, densely hairy to inflorescence, with hairs 5 mm long at base, 2 mm long above, and densely stellate-hairy. Basal leaves withering before anthesis like lower cauline leaves; cauline leaves 16–58 (coefficient of leafiness 0.64–0.84), to 10 cm long, narrowly lanceolate to linear (8–11:1) more or less entire, acute, densely covered with hairs 1–1.5 mm long (upper leaves more sparsely pubescent). Inflorescence umbellate-paniculate, with 2–16 capitula, in part undeveloped; peduncles without hairs and glands, tomentose, with bracteal leaves. Involucres 9–11 mm long; involucre bracts obtuse, dark green, glabrous and eglandular. Flowering August.

Open pine forests, on stony (calcareous) or sandy soil.—*European Part*: Baltic Region. Endemic. Described from Saaremaa (Oesel). Type in Tartu.

Note. This species differs from all species of section *Umbellata* known to us by the very dense hairs on the whole plant, excluding the peduncles and involucre bracts. It is a rare plant.

Subsection 2. Eu-umbellata Juxip.—*Grex H. euumbellatum* Zahn in Pflzr. IV, 280 (1922) 910; in Asch. and Graebn. Synopsis, XII, III, 493.—Plants more or less glabrous, i.e., without conspicuous more or less long hairs, but with short spines, making plants scabrous; shade specimens glabrous and smooth.

Cycle 3. Umbellata Juxip.—Inflorescence (peduncles and involucre bracts) without hairs and glands or very rarely with occasional simple hairs or glands.

- 90 95. **H. umbellatum** L. Sp. pl. (1753) 804, (1763) 1131; Froel. in DC. Prodr. VII, 224; Ldb. Fl. Ross. II, 855; Turcz. Fl. baic.-dahur. II, 173; Boiss. Fl. or. III, 856; Schmalh. Fl. II, 161; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1104; Zahn in Pflzr. IV, 280, 907; Asch. and Graebn. Synopsis, XII, III, 492; Grossh. Fl. Kavk. IV, 272; Krylov, Fl. Zap. Sib. XI, 3060.—*H. elisabethae* Kem.-Nat. Zam. po Sist. i Geogr. Rast. Akad. Nauk GruzSSR, 17 (1953) 128; Fl. Gruzii, VIII, 731.—*H. kluchoricum* Kem.-Nat. l. c., 129; Fl. Gruzii, VIII, 732.—*H. turfosum* Kem.-Nat. l. c. 130; Fl. Gruzii, VIII, 731.—**lc.**: Syreistsch. Fl. Mosk. Gub. III (1910) 367.—**Exs.**: GRF Nos. 625, 1297, 1841–1844; 2093–2095, 2244a, b, 2245–2248.

Perennial. Rhizome shortened, nodular; stem 10–100(–170) cm high (sometimes with several stems from single rhizome), solid, at base woody, erect or flexuous, 1–6.5 mm in diameter, at base often reddish-violet, usually glabrous but scabrous from small spines, very rarely more or less conspicuously hairy, always eglandular, but with stellate hairs, particularly dense in upper part of stem. Basal leaves withering before anthesis just like lowermost cauline leaves (only in subspecies *H. arctophilum* Fr. all leaves persistent at anthesis); cauline leaves very numerous, from 10 to 100 (coefficient of leafiness 0.25 to 1.60), almost identical in shape, gradually reduced upward and transitional to bracteal leaves, lanceolate to narrowly linear (from 3:1 to 120:1), sessile, with tapered, cuneate or slightly rounded base, not amplexicaul; less often leaves short and broad, short-acuminate (latter mainly in specimens damaged at early stage), more or less entire or finely or coarsely toothed (1–5 teeth on each side), stiff, involute (in shade specimens leaves soft, with flat margins), with short spiny hairs (0.1–0.2 mm long) along margin and veins beneath and moderately or more or less densely, arachnoidly stellate-hairy, dark green and usually

without hairs above, but with rare arachnoid pubescence (less often absolutely glabrous). Inflorescence umbellate (at least at tip), but in lower part often paniculately corymbose (more or less long peduncles arising from axils of upper leaves), with 1–140 (or more) capitula, of which usually part more or less undeveloped; bracteal leaves linear, gradually transitional to involucre bracts; peduncles slender, stellate-hairy, almost always without hairs and glands. Involucres (8–)9–11 (–12) mm long, ovate, with truncate base; involucre bracts dark, less often light green (blackish after drying) or deep black (*H. arctophilum* Fr.), mostly obtuse, outer bracts divergent, with recurved tips (very distinct in live specimens), without simple hairs, glands and stellate hairs, less often with sparse stellate hairs at base of leaves or conspicuously stellate-hairy (subvar. *asterophorum* Zahn), quite rarely with occasional hairs and glands (forms of dunes and other habitats); edges of receptacular alveoli ciliate. Florets golden-yellow; teeth of ligules without cilia; stigmas usually yellow, later turning dark, less often dark or black. Achenes black, 3 mm long. Flowering (July) August to September (October).

Coastal dunes, pine forests, sands, heaths, open deciduous forests, coastal willow groves, dry valley-, floodplain-, less often steppe-meadows, rocky slopes and screes, old and fallow fields, in mountains to 1000–1500 m (in southern regions, for example, in Transcaucasia, to 2600 m).—*European Part*: All districts (in the Arctic only along southern border) except Crimea (?); *Caucasus*: All districts; *Eastern and Western Siberia*: All districts; *Far East*: All districts; *Soviet Central Asia*: Excluding Kyzyl-Kum, Kara-Kum, mountainous Turkmenia, Amu-Darya, Syr-Darya districts. *General distribution*: Scandinavia, Central Europe, Atlantic Europe, Mediterranean (except southern Spain and Sicily), Balkans-Asia Minor, Armenia-Kurdistan, Iran, Indo-Himalayas, Dzhungaria-Kashgaria, Mongolia, Japan, China, Bering Region, North America. Described from Sweden.

Note. It is a highly polymorphic species, distinguished mainly by the coefficient of leafiness, width and shape of the leaves and pubescence.

According to Zahn's hypothesis, *H. laevigatum*, *H. vulgatum*, *H. diaphanoides*, *H. nurorum*, on one hand, and *H. caesium*, *H. bifidum*, on the other have originated from *H. umbellatum* L., one of the most ancient species, by adaptation of the achenes to earlier maturation. As a widespread (circumboreal) aggregate species, it makes an excellent object for the study of relationships between the morphological structure and the corresponding plant community (Zahn in Asch. and Graebn. *Synopsis*, XII, III (1938) 493).

Economic Importance. In the Caucasus it is used for dying wool and silk (Grossh., *Rast. Rass. Kavk.* (1946) 360). The same (for wool) is also true for the Baltic Region (Wiedeman and Weber, *Beschreib. d. phaner. Gew. Esth-, Liv- u. Curlands* (1852) 463).

Section 8. *Tridentata* Fr. Epicr. (1862) 113; Peter in Pflanzenfam. IV, 5, 375; Zahn in Pflzr. IV, 280, 36, 856; in Asch. and Graebn. Synopsis, XII, III, 419.—*Rigida* Lintt. Brit. Hier. (1905) 76.—Involucral bracts irregularly imbricate (as in section *Vulgata*), appressed, in part acute, almost always weakly hairy and glandular (like peduncles); cauline leaves quite numerous, uniformly distributed over entire stem (rarely longer than internode), distinctly reduced upward, lower petiolate, middle and upper sessile, with or without tapering base, never amplexicaul; inflorescence paniculate; achenes dark.

Note. The members of this section connect the sections *Umbellata* and *Vulgata* through a continuous transitions from the one to the other, 92 as a result of which the identification of the closely related species often becomes difficult.

The species belonging to this section are mainly distributed in the northern and northwestern districts of the USSR, and also in the Caucasus, but in other districts of our country they are rare or altogether absent in large areas. It is also interesting that some members of the section *Tridentata* apparently have adapted to the conditions of the extreme north better than *H. umbellatum* and have become, for example, in the Murmansk Region, fairly widespread species, whereas *H. umbellatum* is found there very rarely and only in the southern part.

1. Coefficient of leafiness very high for section (0.55–0.30), i.e., plants with relatively large number of cauline leaves and in this (as well as in habit) close to section *Umbellata*.....2.
- + Coefficient of leafiness typical for the section (0.26–0.10).....10.
2. Involucral bracts conspicuously (and at base densely) stellate-hairy, conspicuously covered with stiff dark hairs, glandular; coefficient of leafiness high (0.50).....
-96. *H. goriense* Kozl. and Zahn
- + Involucral bracts without stellate hairs (or with quite sparse hairs); coefficient of leafiness 0.40.–0.30.....3.
3. Stigmas yellow.....97. *H. acrifolium* Dahlst.
- + Stigmas dark.....4.
4. Leaves entire or with (very) small teeth.....5.
- + Leaves with long teeth (alternating with short); plants from Caucasus.....9.

5. All leaves (including middle and upper) with short cuneate or slightly rounded base.....98. **H. umbellaticeps** Pohle and Zahn
 - + Only lowermost leaves narrowed toward base, others (including bracteal leaves) with more or less rounded base.....6.
6. All leaves (broadly) lanceolate, mostly toothed; involucre bracts without hairs and glands.....99. **H. narymense** Schischk. and Serg.
 - + Leaves ovate or ovate-lanceolate, almost entire; involucre bracts with occasional glands.....7.
7. Almost all leaves with rounded base (except lowermost); basal leaves sometimes persisting at anthesis; plants of Urals.....
 -102. **H. plurifoliosum** Schischk. and Steinb.
 - + Only middle and upper leaves with rounded base, lower narrowed toward base; plants of Western Siberia.....8.
8. Plants branched only in upper part.....
 -100. **H. porphyrii** Schischk. and Serg.
 - + Plants branched from base.....101. **H. czaiense** Schischk. and Serg.
- 93 9 (4). Involucre bracts with few hairs and scattered glands (exactly as on peduncles).....103. **H. lancidens** Zahn.
 - + Involucre bracts without hairs, quite sparsely finely glandular; peduncles without hairs and glands.....104. **H. macrolygodes** Zahn.
- 10 (1). Coefficient of leafiness 0.26–0.13 (typical members of section *Tridentata*).....11.
 - + Coefficient of leafiness 0.13–0.10 (species linking *Tridentata* with *Vulgata*).....28.
11. Leaves clearly deeply toothed (with alternate long and short teeth).....12.
 - + Leaves more or less entire (or with small spiny teeth).....18.
12. Stigmas yellow.....13.
 - + Stigmas darker.....16.
13. Stem in lower part densely hairy.....14.
 - + Stem (almost) glabrous or very sparsely hairy.....15.
14. Stem covered with long stiff bristles; involucre bracts more or less without stellate hairs.....108. **H. kubanicum** Litw. and Zahn.
 - + Stem (and involucre bracts) covered with soft white hairs; involucre bracts stellate-hairy at base.....
 -109. **H. dechyi** Kozl. and Zahn.
15. Involucres 8.5–10 mm long; involucre bracts sparsely hairy and glandular; stem almost glabrous.....110. **H. laevigatum** Willd.
 - + Involucres 10–12 mm long; involucre bracts (almost) without hairs but scatteredly glandular; stem scatteredly or moderately short-hairy; plants of the Caucasus.....
 -111. **H. flocciparum** Schelk. and Zahn.

16. Involucral bracts glabrous (without simple hairs and glands, or very rarely with occasional hairs and glands at base), with narrow band of stellate hairs on back; plants of the Caucasus.....107. *H. lissolepium* Zahn.
 + Involucral bracts moderately glandular.....17.
17. Involucral bracts with hairs; leaves more or less broadly lanceolate; peduncles conspicuously hairy; stem at base densely hairy.....105. *H. tridentatum* Fr.
 + Involucral bracts without hairs; stem glabrous at base.....106. *H. laevigans* Zahn.
- 18 (11) Stigmas yellow.....19.
 + Stigmas dark.....23.
19. Stellate hairs of involucral bracts dense; peduncles white-tomentose; plants of Caucasus.....112. *H. leucothyrsus* Litw. and Zahn.
- 94 + Stellate hairs of involucral bracts absent or sparse.....20.
20. Glands on involucral bracts sparse.....21.
 + Glands on involucral bracts scattered.....22.
21. Involucral bracts with occasional, tiny (0.2–0.3 mm long) glands and hairs; peduncles without hairs and glands; stem and leaves glabrous; plants of the Baltic Region.....121. *H. purpuristictum* Juxip.
 + Involucral bracts with sparse (15), quite large (0.5 mm long) glands; leaves dark-brown spotted above; plants of the North.....114. *H. cruentiferum* Norrl. and Lindb. f.
22. Glands on involucral bracts tiny (0.4–0.1 mm long) plants of the North.....119. *H. puschlactae* Pohle and Zahn
 + Glands on involucral bracts large (0.5–0.7 mm long); plants of the Baltic Region.....120. *H. creperiforme* Juxip.
23. Stem in lower part sparsely hairy or almost glabrous.....24.
 + Stem at base densely spiny-haired; plants resembling *H. umbellatum* in habit.....122. *H. rigidum* Hartn.
24. Glands on involucral bracts occasional or sparse.....25.
 + Glands on involucral bracts scattered (40).....27.
25. Involucral bracts 1.5 mm broad, with few (0–10) glands (number of hairs always considerably exceeding that of glands).....117. *H. lapponicum* Fr.
 + Involucral bracts 1.0 mm broad, with more or less sparse (10–30) glands.....26.
26. Involucral bracts with essentially occasional (11), glands 0.2–0.4 mm long, without stellate hairs, leaves very sparsely hairy.....116. *H. dolabratum* Norrl.
 + Involucral bracts with sparse (23) glands, 0.4 mm long, and scattered stellate hairs; leaves scatteredly hairy.....115. *H. mixopolium* Dahlst.

27. Peduncles glabrous, eglandular; leaves narrowly lanceolate to linear; involucre 10–12 mm long; plants of the North.....118. **H. linifolium** Sael. ex Lbg.
 + Peduncles with few hairs (or sparse—var. *tetrinoense* Juxip.) and well developed, 0.4–0.8 mm long glands; involucre bracts 1.5 mm broad.....113. **H. laterale** Norrl.
- 28 (10). Leaves with clearly deeply toothed margin.....29.
 + Leaves usually entire; glands on involucre bracts few or sparse; stigmas dark.....32.
29. Stigmas yellow.....30.
 + Stigmas dark; glands on involucre bracts scattered (40), 0.5 mm long; stem at base with long (5 mm) hairs.....124. **H. achalzichiense** Juxip.
- 95 30. Stellate hairs on involucre bracts almost absent; glands on involucre bracts sparse on moderate.....126. **H. knafii** Čelak.
 + Stellate hairs or involucre bracts more or less dense.....31.
31. Involucre bracts with sparse (17), hairs 0.6 mm long and few (8), glands 0.3 mm long; peduncles without (or with few) hairs and glands.....123. **H. kulkowianum** Zahn.
 + Involucre bracts (like peduncles) without hairs, but moderately glandular with tiny glands 0.2–0.1 mm long; plants of the Caucasus.....125. **H. tridentaticeps** Zahn.
32. Peduncles moderately hairy (hairs 1.5 mm long); involucre bracts with very small (0.2–0.1 mm long) glands, without stellate hairs; plants of the North.....127. **H. trichobrachium** Juxip.
 + Peduncles with occasional hairs or entirely glabrous.....33.
33. Involucre bracts with sparse (25) hairs, and occasional (12) glands; plants of Siberia.....128. **H. bichloricolor** Ganesch. and Zahn.
 + Involucre bracts without or with occasional (1–3) hairs, sparsely (18) glandular; plants of the Baltic Region.....129. **H. dagoense** Juxip.

Cycle 1. Gorja Juxip.—Plants with very high coefficient of leafiness (0.50); leaves usually entire; stigmas dark; involucre bracts densely stellate-hairy.

96. **H. goriense** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 13; Zahn in Pflzr. IV, 280, 889.

Perennial. Stem up to 80 cm high, short-pilose, hairs 0.5–1 mm long, in upper part tomentose. Basal and lower cauline leaves withering before anthesis; cauline leaves to 40 (coefficient of leafiness 0.50), gradually decreasing upward, lower lanceolate, tapered to short petiole, middle broadly lanceolate, barely tapered toward base, upper sessile,

with round base, all leaves acuminate, light green above, pale green beneath, with 2–5 short triangular teeth, with short, simple and also stellate pubescence beneath. Inflorescence paniculate-umbellate, with 25–40 capitula; peduncles short-pilose, with or without occasional glands, white-tomentose. Involucres 8–9 mm long, broadly ovate; involucre bracts obtuse or subacute, dark green with greenish border, moderately or densely hairy with stiff, short, dark hairs, moderately glandular (some very small, 0.5–0.1 mm long) and moderately, but at base more or less densely, stellate-hairy. Stigmas dark. Flowering August.

- 96 *Causasus*: Eastern Transcaucasia. Endemic. Described from Bakuriani (Georgia). Type unknown.

Cycle 2. Acrifolia Juxip.—Plants with high coefficient of leafiness (0.40–0.30); leaves almost entire; stigmas yellow.

97. **H. acrifolium** Dahlst. Bidr. Sydostr. Sverig. Hier-Fl. III (1894) 228; in Lindm. Svensk Fan.-Fl. 2 ed. 628; Zahn in Pflzr. IV, 280, 879; in Asch. and Graebn. Synopsis. XII, III, 463.—Exs.: Dahlst. Hier, exs. fasc. III, Nos. 61, 62; Herb. Hier, Scand., cent IV, No. 74.

Perennial. Stem 35–90(100) cm tall, 2–3.5 mm in diameter, at base or often throughout reddish-violet, hairy below, glabrous above. Basal leaves withering before anthesis; cauline leaves 10–20 (coefficient of leafiness 0.33), oblong-lanceolate (5:1), to 8 cm long, long-acuminate, with 1–3 tiny teeth, middle and upper entire; all leaves dark green, more or less glabrous. Inflorescence paniculate-umbellate, with 6–18 capitula; peduncles without hairs and glands, weakly tomentose. Involucres 9–10(–12) mm long, ovoid, later truncate; involucre bracts obtuse, violet at tips with sparse (10–15), short (0.6 mm long) hairs and few (5–12) tiny (0.2–0.3 mm long) glands, more or less without stellate hairs; stigmas yellow or greenish, later turning brown. Flowering July to August.

Tundra, pine forests.—*European Part*: Dvina-Pechora; *Western Siberia*: Ob Region. *General distribution*: Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type in Stockholm.

Note. For this species Zahn (l. c.) also mentions var. *bodyschense* Zahn from western Transcaucasia (*Vestn. Tifl. Bot. Sada*, 21 (1911) 10). Perhaps the latter should properly be considered a separate species because of its distance from the main range of the species.

Cycle 3. Plurifolia Juxip.—Plants with high coefficient of leafiness (0.40); leaves almost entire, middle and upper with round base; stellate hairs on involucre bracts sparse; stigmas dark.

98. **H. umbellaticeps** Pohle and Zahn in *Algem. Bot. Zeitschr.* XIII (1907) 143; Zahn in *Pflzr.* IV, 280, 891.

Perennial. Stem up to 55 cm high, 2 mm in diameter, glabrous at base, from middle upward scatteredly covered with stiff, white hairs, 1–2 mm long. Basal leaves like lower cauline withering before anthesis; cauline leaves 20 or more (coefficient of leafiness about 0.35), narrowly lanceolate (6.5:1), sessile, long-acuminate, short-cuneate or with somewhat rounded base, upper linear, all leaves finely toothed, with 1–3
97 teeth, more or less glabrous above, scatteredly hairy beneath with short (1 mm long) hairs. Inflorescence paniculate, with 4 capitula; peduncles with few hairs 1–2 mm long, eglandular (or with occasional glands), grayish-tomentose from stellate hairs. Involucre 10 mm long, ovate-cylindrical; involucre bracts lanceolate, somewhat obtuse, blackish, outer often recurved, with occasional, short (0.6 mm long) stiff hairs and few (10) tiny (0.2 mm long) glands. Stigmas dark; resembling *H. umbellatum* in habit linking sections *Umbellata* and *Tridentata*. Flowering August.

European Part: Dvina-Pechora. Endemic. Described from former Vologda Province. Cotype in Leningrad.

99. **H. narymense** Schischk. and Serg. in *Sistem. Zam. po Mat. Gerb. im. Krylova pri Tomsk. Univ.* 1–2 (1949) 23; Krylov, *Fl. Zap. Sib.* XI, 3059.

Perennial. Stem 50–100 cm high, 3–5 cm in diameter, more or less glabrous (sparsely hairy from middle). Basal leaves withering before anthesis; cauline leaves 20–30 (coefficient of leafiness 0.36), broadly lanceolate (5:1), to 13 cm long, with 2–3 straight teeth, lower leaves tapered toward base, middle and upper with more or less distinctly rounded base, all leaves almost glabrous, green above, dark bluish-green beneath. Inflorescence umbellate panicle, with 1–(3–20) capitula; peduncles without simple hairs (or with 1–2 hairs at base), eglandular, moderately stellate-hairy. Involucre 9–10.5 mm long; involucre bracts lanceolate, somewhat obtuse, outer more or less recurved (like *H. umbellatum*), glabrous and eglandular or with occasional, tiny (0.3–0.1 mm long) glands. Flowering August.

Coniferous and birch forests, forest meadows, forest burns and logging areas.—*Western Siberia:* Ob' Region. Endemic. Described from Tomsk Province. Type in Tomsk.

Note. It is a form linking sections *Umbellata* and *Tridentata*.

100. **H. porphyrii** Schischk. and Serg. in *Sistem. Zam. po Mat. Gerb. im. Krylova pri Tomsk. Univ.* 1–2 (1949) 21; Krylov, *Fl. Zap. Sib.* XI, 3058.

Perennial. Stem 60–100 cm high, 3–4 mm in diameter, more or less glabrous. Basal leaves like lower cauline withering before anthesis; cauline leaves numerous (coefficient of leafiness about 0.40), ovate-lanceolate, to 10 cm long, lower tapered toward base, middle and upper with slightly rounded base, all leaves entire or toothed (var. *klopotovii* Serg), glabrous or with rare hairs, 1.5–2 mm long (var. *klopotovii* Serg.) beneath. Inflorescence openly paniculate with long branches and 6–10 capitula; peduncles without simple hairs and glands, but, tomentose from stellate hairs. Involucres (7–)8–10 mm long; involucre bracts appressed, obtuse, dark green, glabrous but with few (to 10), tiny (0.2–0.1 mm long) glands, mainly at base, without stellate hairs. Flowering July.

Birch and mixed forests, forest meadows and scrubs.—*Western Siberia*: Ob' Region. Described from Tomsk Province. Type in Tomsk.

Note. The indication of the authors that the peduncles are quite densely covered with very short glands refers to the tiny spinules of the simple underdeveloped hairs, which are often found on the upper part of the stem and on the peduncles in *H. umbellatum* L.

101. **H. czaiense** Schischk. and Serg. in Sistem. Zam. po Mat. Gerb. im. Krylova pri Tomsk. Univ. 1–2 (1949) 22; Fl. Zap. Sib. XI, 3058.

Perennial. Stem about 35 cm high, branching from base, scatteredly hairy below, more densely above. Basal and lower cauline leaves withering before anthesis; lower and middle cauline leaves obovate or ovate, short-petiolate, upper sessile, with broadly cuneate or rounded base, all leaves entire (or with one short tooth somewhere), beneath, sometimes also above, scatteredly hairy, stellate-hairy and with occasional glands. Inflorescence paniculate, with long unicapitulate branches; peduncles tomentose and with short glands. Involucres 7–10 mm long; involucre bracts with occasional glands, stellate-hairy at base. Flowering August.

Flooded meadows in river valleys.—*Western Siberia*: Ob' Region. Described from Tomsk Province. Type in Tomsk.

Note. We were unable to examine the authentic specimen, and the description is based on the incomplete diagnosis of the authors (l. c.), as a result of which this species is tentatively placed next to *H. porphyrii*. Are we not, in this case, dealing with a damaged (truncated in a younger stage) specimen of *H. porphyrii*, because it is well-known that plants damaged at the beginning of their vegetative period generally branch vigorously and develop broad leaves and glands in the inflorescence (particularly on the involucre bracts)?



102. **H. plurifoliosum** Schisch. and Steinb. in Sistem. Zam. po Mat. Gerb. im. Krylova pri Tomsk. Univ. 1-2 (1949) 25; Krylov, Fl. Zap. Sib. XI, 3057.

Perennial. Stem 40-80 cm high, at base reddish-violet, glabrous. Cauline leaves numerous (basal leaves sometimes persisting at anthesis), lower obovate or lanceolate, only lowermost narrowed to petiole, others, as also middle and upper, ovate, long-acuminate, sessile, with rounded, or slightly cordate base, glabrous, almost all leaves entire or with rare, unequal, very short teeth. Inflorescence corymbose panicle with 1-7 capitula; peduncles sparsely pubescent, glandular, tomentose. Involucres 10 mm long; involucral bracts without simple hairs, with occasional glands and very sparse stellate hairs. Stigmas dark. Achenes to 3 mm long. Flowering July.

Gravel beds on riverbanks, herb-spruce forests.—*Western Siberia*: Ob' Region. Endemic. Described from northern Urals. Type in Leningrad.

Note. This description is based on the incomplete diagnosis by the authors of the species.

Cycle 4. Lancidentia Juxip.—Plants with high coefficient of leafiness (0.40); leaves deeply toothed; stigmas dark; stellate hairs on involucral bracts more or less absent.

103. **H. lancidens** Zahn in Schinz and Keller, Fl. Schweiz, ed. 2, II (1905) 340; Zahn in Pflzr. IV, 280, 890; in Asch. and Graebn. Synopsis, XII, III, 473.—*H. grandidense* Zahn in Koch, Synopsis, 3, II (1901) 1903, non Dahlst.—**Ic.**: Hegi, Ill. Fl. VI, 2, fig. 941.

Perennial. Stem 40-100 cm high, at base sparsely short-pilose. Basal leaves withering before anthesis; cauline leaves 25-30 (coefficient of leafiness 0.40), often large, broadly lanceolate, with 3-5 long (to 2-3 cm), partly broad and obtuse, partly narrow and acute, forward-projecting teeth, large teeth alternating with small teeth, dark green above, grayish-green beneath, covered with very short hairs. Inflorescence paniculate-umbellate; peduncles very long, scatteredly or sparsely hairy and with occasional tiny glands. Involucres (9-)10-11 mm long; involucral bracts somewhat obtuse to acute, dark green to blackish, with light green border, moderately or sparsely hairy (or almost without hairs), with scattered glands, almost without stellate hairs. Stigmas dark, in habit resembling *H. laevigatum*. Flowering August.

Mountains.—*Caucasus*: Eastern Transcaucasia. *General distribution*: Central Europe, Mediterranean, Balkans-Asia Minor. Described from Switzerland. Type unknown.

104. **H. macrolygodes** Zahn in Pflzr. IV, 280 (1922) 891.—*H. longissimum* Peter in Beitr. Hier. Osteur. Orient. (1898) 34; Somm. and Lev. in Tr. Peterb. Bot. Sada. XVI (1900) 308 non Rehm.

Perennial. Stem 30–170 cm high, sturdy, 2–6 mm in diameter moderately hairy below, stellate-hairy above, branched in upper fourth. Basal and lower cauline leaves withering before anthesis; cauline leaves 50 (coefficient of leafiness 0.30–0.70), lanceolate, tapered toward base, sessile, acute, with 3–6 teeth, gradually decreasing upward and transitional to bracteal leaves, sparsely hairy. Inflorescence broadly, openly
102 paniculate, with many capitula; peduncles slender, without hairs and glands, only weakly tomentose. Involucres 9–10 mm long; involucre bracts obtuse, more or less dark with narrow, pale border, outer loose, without simple hairs, sparsely (20–35) glandular with tiny glands, 0.1–0.4 mm long, more or less without stellate hairs. Stigmas brown. Flowering August.

Montane forests.—*Caucasus*: Western Transcaucasia. Endemic. Described from Svanetia. Type unknown.

Cycle 5. Laevigata Juxip.—Plants with normal coefficient of leafiness (0.26–0.20) for section; leaves deeply toothed; stigmas yellow or dark; stellate hairs on involucre bracts sparse.

105. **H. tridentatum** Fr. Nov. fl. Suec. Mant. ed. 1 (1819) 187 pro var. *H. vulgati*, ed. 2 (1839) 48; Symb. 171 p. p.; Epicr. 116 p. p. pro spec.; Sael. in Acta Sos. Fa. et Fl. Fenn. IV, 32; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III, 218; Zahn in Pflzr. IV, 280, 866, non Boiss., nec Green and Godr.—*H. eutridentatum* Zahn in Asch. and Graebn. Synopsis, XII, III (1937) 432.—*Exs.*: Fr. Herb. norm. fasc. III, No. 4 (sub *H. rigidum*), fasc. XII, No. 14a; Dahlst. Herb. Hier. Scand., cent. V, Nos. 73, 74.

Perennial. Stem 30–100 cm high, at base purple and often densely covered with long hairs, sparsely so higher, and almost glabrous above, sparsely tomentose. Basal leaves withering before anthesis or 2–4, crowded, forming pseudo-rosette, oblong, obtuse to oblong-lanceolate and acute, with few long, narrow teeth, glabrous above or with occasional short hairs, sparsely beneath but along midrib and on petiole quite densely long-hairy; cauline leaves 6–15(–30) (coefficient of leafiness 0.26), lanceolate, lower tapered to short, cuneate petiole, with 3–4, narrow, small teeth to 2–5 cm long, middle and upper sessile, with cuneate and rounded base, acuminate, all leaves light green, more pale beneath (glaucous). Inflorescence openly paniculate, with few capitula; peduncles slender, moderately or densely pubescent with short, fine hairs, with small fine glands, often not distinct in dense felt.

Involucres 8–9 mm long; involucre bracts acute, with moderate or occasional, short, dark hairs and sparsely or scatteredly covered with tiny glands concealed by hairs; weakly (in outer bracts up to sparsely) stellate-hairy. Stigmas (yellowish-) brown or dark. Flowering July to August.

Edges of forests, mostly deciduous forests, apparently as rare plant, in all western districts of European Part and the Caucasus. *General distribution*: Scandinavia, Central Europe, Atlantic Europe, Mediterranean Region, Balkans-Asia Minor. Described from Sweden. Type in Uppsala.

- 103 106. *H. laevigans* Zahn in Zobel. Vorarb. Fl. Anhalt. IV (1920) 51; Zahn in Pflzr. IV, 280, 890; in Asch. and Graebn. Synopsis, XII, III, 468.—*Ic.*: van Soest, H. Gesch. Hier. II in Nederl. Kruidkund. Archief (1926) 113, fig. 43; Hegi, Ill. Fl. VI, 2, 1334.—*Exs.*: GRF No. 2078 (f. *parcifloccum* Litw. and Zahn).

Perennial. Stem to 130 cm high, often quite thick, colored only at base, sparsely hairy or with stiff, broken hairs (hence stem scabrous), sometimes long-branched above down to middle, stellate-hairy. Basal and lower cauline leaves withering before anthesis; cauline leaves (10–)15–20(–40) (coefficient of leafiness 0.25), evenly distributed, gradually reduced upward, broadly elliptical-lanceolate (4:1), lower tapered to petiole, often long (to 16 cm), upper ovate-lanceolate, sessile, all leaves with uneven long teeth alternating with fine teeth (to 1 cm long), more or less glabrous above, sparsely pubescent beneath and a long margin, often violet. Inflorescence branched paniculate-umbellate, with 20–40 capitula; peduncles slender, long, glabrous (or with few hairs), eglandular or with small number of tiny glands and with scattered stellate hairs. Involucres 8–10 mm long; involucre bracts more or less obtuse, dark green, with light green margin, almost always without simple hairs, moderately or scatteredly glandular, glands 0.5–0.2 mm long, without or with few stellate hairs (f. *parcifloccum* Litw. and Zahn); florets golden-yellow; stigmas dark. Flowering July to August.

Edges of open forests.—*European Part*: Upper Volga; Caucasus: Western Transcaucasia. *General distribution*: Central Europe. Described from Germany. Type unknown.

107. *H. lissolepium* Zahn in Pflzr. IV, 280 (1922) 888; in Asch. and Graebn. Synopsis, XII, III, 479.—*H. lineatum* Alm. ex Stenstr. Varml. Archier. (1889) 72; Dahlst. Bidr. Sydostr. Sverig. Hier.-Fl. III, 240; non Arv.-Touv. (1913), nec Brig. (1897).—*H. rigidum laevigatum* Fr. Symb. (1848) 174.—*Exs.*: Fries Herb. norm. fasc. IX, No. 3, p. p. (sub

H. rigidum laevigatum); Dahlst. Hier. exs. fasc. III, Nos. 68, 69; Lbg. Hier. Scand. exs. No. 81 (sub *H. friesii* Hartm.).

- Perennial. Stem 50–100 cm high, dark purple at base, green above, glabrous, sparsely tomentose above. Basal and lower cauline leaves withering before anthesis; cauline leaves 8–15(–30) (coefficient of leafiness 0.24), lowermost oblong, petiolate, more or less entire, following leaves lanceolate, cuneately tapered to petiole, sparsely denticulate, middle lanceolate, with long and sharply attenuated, entire tip, in lower half with long narrow, awl-shaped and short, broad teeth alternating, upper leaves narrowly lanceolate to linear, sessile with wide base, semi-amplexicaul, at base with 3–4 acute teeth, light green, without simple hairs (margin scabrous from spinules) above, on both sides stellate-hairy (denser beneath).
- 104 Inflorescence paniculate, with many capitula; peduncles almost without simple hairs and glands, stellate-hairy to tomentose below capitula. Involucres 10 mm long; involucral bracts lanceolate, subobtus (outer bracts loose), without simple hairs and glands (sometimes with 1–2 glands at base), with narrow band of stellate hairs along back. Stigmas dark. Flowering August.

Caucasus: Eastern Transcaucasia(?). *General distribution*: Scandinavia (southern part), Central Europe, Atlantic Europe. Described from Sweden. Type in Uppsala?

Note. Reported from Eastern Transcaucasia on the basis of Zahn's report. The Caucasian specimens could not be examined.

The Fries, specimen cited, *Herb. norm. fasc. IX*, No. 3 (according to Zahn), does not always conform to *H. lineatum* Almqu., and it is necessary to assume that heterogenous material was pasted to the sheets.

108. **H. kubanicum** Litw. and Zahn in Fedde, Repert. IV (1907) 240; Sched. HFR VII, 32; Zahn in Pflzr. IV, 280, 879.—**Exs.**: Zahn, Hier. Europe. No. 387; GRF No. 2079.

Perennial. Stem 50–70 cm high, more or less slender, striate, at base violet and conspicuously covered with more or less stiff, erect bristles to 4 mm long, with less conspicuous (and shorter) hairs above, quite prominent tomentum and with occasional tiny glands. Basal leaves mostly withering (0–3) before anthesis as well as lowermost cauline leaf; cauline leaves 12–15 (coefficient of leafiness 0.22), broadly or narrowly lanceolate, to 20 cm long (5:1), gradually reduced, attenuated toward base, sessile, acuminate, coarsely toothed (with 3–5 teeth to 1 cm long) and alternating with short serrate teeth, scatteredly short-hairy (near margin) on both sides, covered quite densely along margin and midrib beneath with hairs to 2 mm long. Inflorescence openly paniculate, with (3–)7–16 capitula; peduncles covered with

occasional, short hairs and tiny glands, grayish-tomentose, involucre 8–9.5 mm long, ovate-cylindrical, later truncate, involucre bracts obtuse, green-black, with few 4(3–6), short (0.6 mm long) hairs (mainly toward apex) and scattered to moderate, 56(43–64), glands 0.2–0.4 mm long, with yellow heads, more or less without stellate hairs (apex with beard). Stigmas yellow, turning grayish. Flowering July to August.

Montane pine forests at 1260 m.—*Caucasus*: Transcaucasia. Endemic. Described from Teberda. Type in Leningrad.

Note. In habit it resembles *H. lancidens* Zahn but is distinguished by yellow stigmas and dense pubescence at the base of the stem.

109. *H. dechyi* Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 14; Zahn in Pflzr. IV, 280, 880.

- 105 Perennial. Stem 30–50 cm high, slender, softly white-pubescent with hairs 1–3 mm long, grayish-tomentose above. Basal leaves and lowermost cauline leaf usually withering before anthesis; cauline leaves 7–9 (coefficient of leafiness 0.20), lanceolate, gradually reduced toward apex, irregularly serrate and with 2–3 larger teeth, upper leaves sessile, acuminate, green, glabrous above with sparse short hairs beneath, densely ciliate along margin, uppermost leaves narrow, transitional to bracteal leaves, with both sides stellate-hairy. Inflorescence paniculate, with 3–15 capitula; peduncles slender, upright, scatteredly covered with white hairs dark at base and moderately glandular, grayish-tomentose. Involucre 10 mm long, ovate; involucre bracts lanceolate, subobtuse (inner bracts subacute) moderately or densely covered with white, curly hairs and moderately finely glandular, at base stellate-hairy. Stigmas yellowish-brown. Flowering August.

Caucasus: Eastern Transcaucasia. Endemic. Described from Bakuriani. Type unknown.

110. *H. laevigatum* Willd. Sp. pl. III, 3 (1800) 1590; Froel. in DC. Prodr. VII, 220; Schmalh. Fl. II, 160; Zahn, Hier. fl. Mosquens. 66; Zahn in Pflzr. IV, 280, 893.—*H. eu-laevigatum* Zahn in Asch. and Graebn. Synopsis, XII, III (1937) 460.—*H. jacobaeaeifolium* Froel. in DC. Prodr. VII (1838) 223, pl. cauc.—*H. firmum* Jord. Cat. Dijon (1848) 22; Sudre, Hier. du Centre de la France, t. VII, 35.— *Ic.*: Syreistsch. Fl. Mosk. Gub. III (1910) 365.— *Exs.*: Zahn, Hier. Europ. Nos. 488, 894.

Perennial. Stem to 100 cm high, 3.5–5 mm in diameter, more or less glabrous, violet in lower third, more or less tomentose above. Basal leaves usually withering before anthesis; cauline leaves 7–13 (–40) (coefficient of leafiness 0.20), lanceolate (6:1), lower large (to 26 mm long), long-petiolate, acuminate, scatteredly pubescent with

short hairs 0.5–1 mm long, middle short-cuneate-petiolate, subsessile, all leaves toothed, with 5–7 unequal, large and small, sharply serrate teeth, green, often (particularly beneath) violet. Inflorescence paniculate, with 20–40 capitula on long branches; peduncles with occasional short (0.6 mm-long) hairs and sparse tiny (0.3 mm-long) glands, tomentose. Involucres 8.5–10 mm long, ovate, later truncate; involucral bracts mostly more or less obtuse, sparsely hairy, hairs 0.7 mm long and with sparse tiny glands 0.3 mm long, more or less without stellate hairs. Stigmas yellow or greenish, later turning brown. Flowering July to August.

Sandy slopes, edges of pine forests.—*European Part*: Upper Volga, Upper Dniester (apparently, in all western districts of European Part of Soviet Union); *Caucasus*: Dagestan, Eastern and Western Transcaucasia. *General distribution*: Central Europe, Mediterranean Region, Balkans-Asia Minor. Described from Germany. Type in Berlin.

- 106 **Note.** Zahn reports the distribution of this species to be from Spain and France through all of Central Europe to Eastern Siberia (Irkutsk). The last location is true, however, only for *H. laevigatum* s. l., i.e., if it includes *H. bichloricolor* Ganesch. and Zahn, but not for *H. laevigatum* s. str. (= *H. firmum* Jord. = *H. eu-laevigatum* Zahn). The last species is found, as mentioned above, only in the western districts of the European Part of the Soviet Union, reaching the Moscow Region, but is absent in the northern districts, and is generally a rare plant in our country. Later (1937), however, Zahn corrected his mistake by giving its distribution in the western half of the European Part of the Soviet Union.

111. **H. flocciparum** Schelk. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 12; Zahn in Pflzr. IV, 280, 879.

Perennial. Stem 40–70 cm high, at base reddish, scatteredly or moderately pubescent with short hairs, densely tomentose, particularly in upper part (hence, stem grayish-green). Basal Leaves oblong-lanceolate, usually withering before anthesis; cauline leaves 8–10(–18) (coefficient of leafiness 0.22), elliptical- or oblong-lanceolate, lower with winged petiole, remaining ones sessile, with narrowed base, upper with round base, all leaves with 3–4 long and acute and 2–3 tiny teeth, upper leaves ovate-lanceolate, all leaves short-hairy beneath and along midrib and margin (as well as on petiole), with both sides conspicuously (densely beneath) stellate-hairy. Inflorescence openly paniculate, with (1–2)7–14 capitula; peduncles with short, scattered hairs and scattered, tiny glands, white-tomentose. Involucres 10–12 mm long, fleshy; involucral bracts lanceolate, subacute, dark, with green border (almost) glabrous but scatteredly glandular, at base

scatteredly stellate-pubescent. Stigma yellowish-brown. Flowering July to August.

Mountains.—*Caucasus*: Eastern Transcaucasia. Described from Ai-Dara District (Kirovobad Region). Type unknown.

Cycle 6. Leucothyrsa Juxip.—Plants with normal coefficient of leafiness for the section, leaves denticulate; stigmas yellow; stellate hairs on involucre bracts dense.

112. *H. leucothyrsus* Litw. and Zahn in Fedde, Repert. IV (1907) 240; Zahn in Pflzr. IV, 280, 859.

Perennial. Stem 30–50 cm high, 2–3 mm in diameter, erect, striate, in lower half moderately (more weakly upward) covered with retrorse soft white hairs 2–3 mm long, densely stellate-hairy. Basal leaves 0–4, often large, elliptical or lanceolate, tapered to petiole and acuminate toward apex, serrately (spiny) toothed, dark green, above with sparse or scattered hairs 1.0 mm long or glabrous, beneath pale green with scattered hairs; cauline leaves 6–13 (coefficient of leafiness 0.24), abruptly reduced upward, broadly lanceolate (4:1), sessile, acuminate, with cuneate base, stellate-hairy beneath (upper leaves on both sides). Inflorescence openly paniculate, with 7–15 capitula; peduncles with white-hairs (from occasional to scattered), eglandular (or with few glands), white-tomentose. Involucres 9.5–10.5 mm long, ovate, involucre bracts acute, dark green, with pale border, having sparse (20), white, soft hairs 1–1.5 mm long, and few (0–6) glands 0.3 mm long, densely stellate-hairy (at base and along margin). Stigmas yellow, turning brown. Flowering June to August.

Caucasus: Ciscaucasia, Eastern and Western Transcaucasia. Endemic. Described from Teberda. Type in Tbilisi.

Cycle 7. Lapponica Juxip.—Plants usually short (40 cm high), with normal coefficient of leafiness for section (0.24–0.16); leaves more or less entire; stigmas yellow or dark; stellate hairs on involucre bracts quite sparse.

113. *H. laterale* Norrl. in Herb. Mus. Fenn. ed. 2 (1889) 147; in Mela-Cajander, Suom. Kasvio, 729; Zahn in Pflzr. IV, 280, 858 (nota).—*Exs.*: Norrl. Hier. exs. fasc. VI, Nos. 72–74.

Perennial. Stem 20–60 cm high, 1–4 mm in diameter, at base violet, scatteredly hairy; with occasional hairs above, often with occasional glands below inflorescence. Basal leaves usually withering before anthesis (or 1–2); cauline leaves 4–14 (coefficient of leafiness 0.24), lanceolate, narrowed toward base and acuminate, slightly toothed,

with 2–4 teeth, scatteredly hairy (more or less prominently along midrib and margin beneath, glabrous above). Inflorescence paniculate, with 7(1–16) capitula; peduncles with occasional, short hairs, 0.8 mm-long or few longer, 1–1.5 mm (var. *tetrinoëns* Juxip) and equally well developed glands 0.4–0.8 mm long, tomentose from stellate hairs. Involucres 8.0–10.0 mm long; involucre bracts 1.5 mm wide, lanceolate, more or less obtuse, with few, 1–4, hairs 0.5–1.0 mm long and scattered, 38(33–48), glands 0.5 mm long, more or less without stellate hairs. Stigmas dark; close to *H. lapponicum*. Flowering July to August (September).

Sandy and stony riverbanks, dry meadows.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from northern Finland. Type in Helsinki.

114. **H. cruentiferum** Norrl. and Lindb. fil. in Norrl. Hier. exs. fasc. VI (in sched.); Norrl in Mela-Cajander, Suom. Kasvio, 733; Zahn in Pflzr. IV, 280, 872 (nota).—**Exs.**: Norrl. Hier. exs. fasc. VI, Nos. 43, 44.

108 Perennial. Stem 25–40 cm high, 1–2 mm in diameter, more or less glabrous. Basal leaves withering before anthesis; cauline leaves 5–12 (coefficient of leafiness 0.23), narrowly lanceolate (8:1), to 10 cm long, dull green, dark-spotted above, bluish-green beneath, lower leaves narrowed to petioles, upper sessile, more or less linear, all leaves slightly denticulate (or with 2–4, more or less prominent teeth), almost glabrous (or with occasional hairs along midrib beneath), somewhat stellate-hairy above. Inflorescence paniculate, with 2–6 capitula; peduncles without simple hairs, eglandular, with grayish stellate hairs. Involucres (8–)9–10(–11) mm long; involucre bracts dark, subacute, without simple hairs but with sparse, (15), glands 0.5 mm long, more or less without stellate hairs. Stigmas yellow, later turning dark. Flowering July to August.

Riverbanks, gravel beds.—*European Part*: Dvina-Pechora. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. The distinct spotting on the leaves of fresh specimens often vanishes during drying and is hard to see on old herbarium specimens.

115. **H. mixopolium** Dahlst. Bidr. Sydostr. Sverig. Hier.-Fl. III (1894) 224; in Lindm. Sevensk Fan.-Fl. 2 ed. 628; Zahn in Pflzr. IV, 280, 881; in Asch. and Graebn. Synopsis, XII, III, 455.—**Exs.**: Norrl. Hier. exs. fasc. VIII, No. 90; Zahn, Hier. Evrop. No. 594.

Perennial. Stem 20–85 cm high, sturdy, 1.5–5 mm in diameter, at base violet, sparsely hairy, more or less glabrous above. Basal leaves (as well as lowermost cauline leaves) withering before anthesis; cauline

leaves 6–23 (coefficient of leafiness 0.22), lanceolate, to 14 cm long (6:1), indistinctly toothed or with 3–5 short teeth (large specimens double-toothed, i.e., short teeth are found between two more or less long teeth), lower leaves narrowed to winged petiole, middle and upper sessile, cuneately narrowed, long-acuminate, light green, more or less glabrous above, moderately, 13(5–28), hairy beneath, hairs 0.7–1.2 mm long. Inflorescence paniculate-umbellate, with 2–10 capitula; peduncles with occasional short hairs 0.8 mm long and glands 0.3 mm long, scatteredly stellate-hairy. Involucres 9–9.5 mm long, ovate, later truncate; involucre bracts lanceolate, more or less obtuse, dark, with few, 3(0–10), short hairs 0.7 mm long and sparse, 23(12–30)–50, tiny glands 0.1–0.4 mm long, whole surface scatteredly stellate-hairy. Stigmas dark. Flowering July to August.

On floodplain meadows, stony banks of rivers and lakes, along edges of forests on stony soil.—*European Part*: Karelia-Lapland, Ladoga-Ilmen (Leningrad, Levashevo), Baltic Region. *General distribution*: Scandinavia, Central Europe. Described from Sweden. Type in Stockholm.

116. **H. dolabratum** Norrl. Bidr. Skand. Hier.-Fl. I (1888) 115;
 109 Hieracium in Herb. Mus. Fenn. ed. 2, 147; in Mela-Cajander, Suom. Kasvio, 729; Zahn in Pflzr. IV, 280, 859.—*Exs.*: Norrl. Hier. exs. fasc. VI, Nos. 75–84, 86 (f. *glabrius*)

Perennial. Stem 20–70 cm high, 1–3.5 mm in diameter, usually more or less glabrous, but sometimes slightly hairy in lower part (f. *verum* Zahn), eglandular. Basal leaves mostly withering (0–4) before anthesis; cauline leaves 8(4–15) (coefficient of leafiness 0.22), narrowly lanceolate or ligulate (7.5:1), to 16 mm long, narrowing toward base, long-acuminate, with 3–5 tiny teeth, upper leaves often linear, hairs on leaves sparse: sometimes beneath with occasional short hairs 0.6–1.5 mm long. Inflorescence paniculate, with (1–7)4–18(–21) capitula; peduncles glabrous and eglandular or with occasional short hairs 1 mm long and tiny glands 0.2 mm long (f. *verum* Zahn). Involucres (8–)9–10(–11) mm long; involucre bracts subobtuse, dark, with occasional, 4(0–14), short, dark hairs 0.3–1 mm long and sparse, 11(4–29), glands 0.2–0.4 mm long, almost without stellate hairs. Stigmas dark (black) or yellowish brown. Flowering July to September.

In tundra along stony and sandy banks of rivers and lakes, on rocks in elfin birch woodlands, pine moorlands.—*European Part*: Karelia-Lapland, Dvina-Pechora; *Western Siberia*: Ob' Region. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. Together with *H. lapponicum* Fr. it is the most commonly found species of this section.

117. **H. lapponicum** Fr. Epicr. (1862) 114; Norrl. in Mela-Cajander, Suom. Kasvio, 728; Dahlst. in Lindm. Svensk Fan.-Fl. 2, ed. 627; Zahn in Pflzr. IV, 280, 858.—Exs.: Norrlin, Hier. exs. fasc. VI, Nos. 64–71.

Perennial. Stem 17–55 cm high, 1–2 mm in diameter, more or less glabrous, at base violet. Basal leaves 0–3, mostly withering before anthesis; cauline leaves 6(4–12) (coefficient of leafiness 0.20), lower leaves ovate or spatulate, obtuse, others lanceolate, acute, to 16 cm long (6:1), slightly denticulate (3–5), often violet beneath, pubescence very sparse, concentrated mainly beneath along midrib and margin of leaves, or sometimes densely hairy; moderate (14) above, dense (28) beneath, hairs 0.8–1.0 mm long (var. *pomosdinense* (Pohle and Zahn) Juxip). Inflorescence paniculate, with 3(1–6)12 capitula; peduncles without hairs, eglandular, more or less tomentose. Involucres 9(8–11.5) mm long; involucre bracts obtuse, with violet tips, with scattered hairs 10(3–25), 1 mm long and few, 2(0–9), glands 0.3 mm long, almost without stellate hairs. Stigmas dark. Flowering July to September. (Plate II, Fig. 2.)

Banks of rivers and streams, on slopes, stony screes and rocks.—*European Part*: Karelia-Lapland, Dvina-Pechora. *General distribution*: Scandinavia. Described for northern Sweden. Type in Uppsala.

110 **Note.** Zahn reports that a similar plant grows in Transcaucasia, which is improbable in view of the large gap in the range.

118. **H. linifolium** Sael. ex Lbg. in Blytt Norg. Fl. II (1874) 662, and in Hartm. Handb. Scand. Fl. ed. 11 (1879) 48, and in Acta soc. Fa. et Fl. Fenn. IV (1877); Norrl. in Mela-Cajander, Suom. Kasvio, 729; Zahn in Pflzr. IV, 280, 859.—Exs.: Fr. Herb. norm. fasc. XVI, No. 9; Hier. Europ. No. 127b (sub *H. gothicum* × *pseudolapponicum*): Norrl. Hier. exs. fasc. VI, Nos. 85–89.

Perennial. Stem 20–70 cm high, 1–3 mm in diameter, at base violet, more or less glabrous, with sparse stellate hairs above. Basal leaves 0 to 4, usually narrowly lanceolate (6:1), narrowed to petiole, to 9 cm long, glabrous; cauline leaves 5–8(–20) (coefficient of leafiness 0.20), narrowly lanceolate (9:1) to linear, persistent, sessile, with somewhat narrowed base, acute, denticulate (2–3), grayish-green, almost without simple hairs but with stellate hairs. Inflorescence paniculate, with 1–5 (or more) capitula; peduncles without simple hairs, eglandular, scatteredly stellate-hairy. involucres 10–12 mm long; involucre bracts more or less broad, more or less obtuse or inner bracts subacute, sparsely or scatteredly covered with short (1 mm long) hairs and scattered (often only few) glands, almost without stellate hairs. Stigmas dark. Flowering July to August.

Stony places, granite rocks.—*European Part*: Karelia-Lapland, Dvina-Pechora. *General distribution*: Scandinavia. Described from Sweden. Type in Uppsala.

Note. This species is exceptionally variable with respect to the pubescence of the involucre, forming many diverse forms.

119. **H. puschlachtae** Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 143; Zahn in Pflzr. IV, 280, 886.

Perennial. Stem 20–60 cm high, 1.5–3 mm in diameter more or less glabrous throughout or at base sparsely hairy. Basal leaves withering before anthesis; cauline leaves 6–14 (coefficient of leafiness 0.20), lanceolate, to 14 cm long (7:1), acute, lower leaves narrowed to winged petiole, middle and upper sessile, with tapered cuneate base, all leaves finely serrate, with 5–7 spinescent teeth, almost glabrous (with occasional to scattered hairs beneath along midrib). Inflorescence paniculate, with 6(2–20) capitula; peduncles slender, more or less without simple hairs, but with occasional glands and scattered stellate hairs. Involucres 8.5–10.5 mm long, ovate, with truncate base; involucre bracts narrow, to 1 mm wide, acute, dark, without simple hairs (or with few, 0–3, hairs) but with scattered, 30(24–40), tiny glands 0.1–0.4 mm long and at base with sparse stellate hairs. Stigmas yellow, turning brown; florets often tubular. Flowering July to August.

Meadows along banks of rivers and streams, gravel beds, sea-coast:—*European Part*: Dvina-Pechora; *Western Siberia*: Ob' Region (northern Urals). Endemic. Described from Pushlakhta (coast of White Sea). Type in Leningrad.

111 120. **H. creperiforme** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XX (1959) 472.

Perennial. Stem 55–65 cm high, 2 mm in diameter, more or less glabrous. Basal leaves withering before anthesis; cauline leaves 10–12 (coefficient of leafiness 0.18), oblong-lanceolate, scarcely toothed to 20 cm long (6.7:1), more or less glabrous. Inflorescence paniculate, with 5–17 capitula; peduncles almost glabrous. Involucres 9 mm long; involucre bracts with few (1–2) short-hairs 0.6 mm long and scattered, 40(23–50), glands 0.5–0.7 mm long, sparsely stellate-hairy. Stigmas yellow; in habit of plant resembling *H. umbellatum*, but with well-developed glands as in certain species of *H. vulgatum* L. s. l. Flowering July to August.

Forest edges.—*European Part*: Baltic Region. Endemic. Described from Hiiumaa (Dagö). Type in Riga.

121. **H. purpuristictum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 472.

Perennial. Stem 30–80 cm high, 1–3 mm in diameter, at base red-violet (spotted), glabrous. Basal leaves withering before anthesis; cauline leaves 5–15 (coefficient of leafiness 0.16), lanceolate, to 15 cm long (5.3:1), with 3–5 short teeth, upper leaves entire, linear, almost without simple hairs (occasional hairs only on midrib beneath), stellate-hairy, olive or dark green. Inflorescence paniculate-umbellate, with 4–15 capitula; peduncles without hairs and glands, scatteredly tomentose. Involucres 8.5–10 mm long; involucral bracts with few, 0–9, hairs 1 mm long, and 3–4, tiny glands 0.2–0.3 mm long, with prominent stellate hairs. Stigmas yellow; plant habit resembling *H. umbellatum* but is distinguished from it by smaller coefficient of leafiness and pubescence of the bracts. Flowering July to August.

Edges of forests on stony soil.—*European Part*: Baltic Region. Endemic. Described from Saaremaa Island (Oesel). Type in Riga.

Cycle 8. Rigida Juxip.—Plants with coefficient of leafiness 0.20, usually tall (70 cm high); stem as well as leaves usually distinctly hairy; stigmas dark; involucral bracts without stellate hairs.

122. **H. rigidum** Hartm. Handb. Scand. Fl. ex. 1 (1820) 300; Fr. Symb. 174 p. p.; Dahlst. Bidr. Sydostr. Sverig. Hier.-Fl. III, 226; Lidm. Svensk. Fan.-Fl. ed. 2, 628; Zahn in Pflzr. IV, 280, 886, non Fr., nec Sudre.—*H. eurigidum* Zahn in Asch. and Graebn. Synopsis, XII, III (1937) 470.—*H. affine* Froel. in DC. Prodr. VII (1838) 221—**Exs.**: Fries, Herb. norm. fasc. V, No. 6; Lbg. Hier. Scand. exs. No. 76; Dahlst. Herb. Hier. Scand. fasc. V, No. 77.

112 Perennial. Stem 30–100 cm high, sturdy, at base blackish-violet, densely covered with stiff spines to 3 mm long, less densely hairy upward, scabrous, almost glabrous above, sparsely tomentose. Basal leaves sometimes persisting until anthesis; cauline leaves 6–15(–25) (coefficient of leafiness 0.20), lower leaves sometimes clustered, forming pseudo-rosette, with both sides short-hairy, others remote, often quite long, mostly lanceolate, with tapered base, long-acuminate, sharply serrate, with 2–5 unequal, short teeth, mostly quite densely (upper leaves on both sides) stellate-hairy (sometimes leaves very narrowly lanceolate with very long, narrow teeth—var. *corvipedifolium* Zahn); glabrous above, densely pubescent beneath along midrib, margins scabrous from spinules, somewhat involute. Inflorescence paniculate-umbellate with short, upright branches and many capitula; peduncles glabrous and eglandular, or with occasional hairs below capitula, or with considerable number of hairs 1 mm long, mainly tomentose, with dark bracteal leaves. Involucres 8–9 mm long; involucral bracts mostly obtuse, dark; outer bracts divergent, with occasional or few, long, dark

hairs (or without hairs) and very sparse to scattered, 20(12–35) glands, 0.2–0.5 mm long, without stellate hairs. Stigmas dark; plant habit resembling *H. umbellatum*. Flowering July to August.

European Part: In all western districts; *Caucasus:* (Western). *General distribution:* Scandinavia, Central Europe. Described from Sweden. Type unknown.

Cycle 9. Knafia Juxip.—Plants with low coefficient of leafiness (0.14–0.10); leaves distinctly toothed; stigmas yellow (or dark); stellate hairs dense to absent.

123. *H. kulkowianum* Zahn, Hier. fl. Mosquens. (1911) 67; Zahn in Pflzr. IV, 280, 860.

Perennial. Stem 50–60 cm long, 2 mm in diameter, more or less glabrous (occasional hairs in middle). Basal leaves withering before anthesis, or 1–3, ovate or oblong-lanceolate, outer leaves with short and widely spaced teeth, inner leaves denticulate, dark green and glabrous above, pale green beneath with occasional hairs; cauline leaves 6–8 (coefficient of leafiness 0.13), broadly lanceolate, (3.5:1), to 16 cm long, irregularly emarginately toothed petiolate, gradually reduced upward, sparsely hairy, upper leaves stellate-hairy on both sides. Inflorescence paniculate, with 4 capitula; peduncles glabrous, eglandular (or with occasional hairs and glands). Involucres 9–10 mm long; involucral bracts with sparse (17), short hairs (0.6 mm long) and occasional (8), short glands (0.3 mm long), densely stellate-hairy. Stigmas yellow. Flowering July to August.

Parks, escape?—*European Part:* Upper Volga (vicinity of Moscow: Kuntsevo, Gorenki). Endemic? Described from Kuntsevo. Type in Leningrad.

113 **Note.** In the diagnosis (l. c.) Zahn says the color of the stigma is dark, but in the specimens studied the stigmas are yellow.

124. *H. achalzichiense* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX. (1959) 473.

Perennial. Stem 75 cm high, sturdy, 4 mm in diameter, at base violet and sparsely covered with long hairs to 5 mm long, almost without simple hairs above, but with stellate hairs. Basal leaves withering before anthesis; cauline leaves 10 (coefficient of leafiness 0.13), lanceolate (4:1), lower leaves long-petiolate, to 24 cm long, middle and upper leaves more or less sessile, more or less toothed, glabrous above, with occasional hairs beneath. Inflorescence paniculate, with long branches, 10 capitula; peduncles with occasional hairs 1 mm long and sparse glands, 0.5 mm long, tomentose. Involucres 11 mm long;

involucral bracts with occasional, (8), hairs 1 mm long and scattered, (40), glands 0.5 mm long, mostly without stellate hairs. Stigmas dark; plant habit resembling *H. laevigatum* but can be distinguished from the latter by small coefficient of leafiness and quite numerous glands on involucral bracts. Flowering August.

Ravines.—*Caucasus*: Southern Transcaucasia. Endemic. Described from Akhaltsikh District. Type in Leningrad.

Note. It is a form intermediate between sections *Tridentata* and *Prenanthoidea* (subsection *Aestiva*). The description was based on the only specimen, a defective one, collected by G. Radde in 1875 in the Dzhikhi-Dzhvari Ravine. It would be quite interesting had plants of this species been collected in good condition and in large numbers.

125. **H. tridenticeps** Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 29; Zahn in Pflzr. IV, 280, 860.

Perennial. Basal leaves mostly withering before anthesis; cauline leaves 6–10, ovate-lanceolate, broadly, 3–4 toothed. Inflorescence paniculate; peduncles glabrous but with moderate number of tiny glands. Involucres 9 mm long; involucral bracts narrow, more or less obtuse, greenish, outer loose, glabrous but moderately glandular with very small glands, quite densely stellate-hairy along margin. Stigmas yellow. Flowering July.

Caucasus: Western Transcaucasia. Endemic. Described from former Batumi District. Type unknown.

Note. The description is based on Zahn's (l. c.) incomplete diagnosis.

126. **H. knafii** Čelak. Prodr. Fl. Bohm. ed. I (1871) 203 (pro var. *H. vulgatum* γ. *knafii*); Zahn; in Pflzr. IV, 280, 859; in Asch. and Graebn. Synopsis, XII, III, 422.

114 Perennial. Stem 30–70 cm high, mostly colored, hairy, in upper part stellate-hairy. Basal leaves 0–2(–5), ovate to broadly lanceolate (outer usually withering before anthesis), often large, to 20 cm long (4–5:1), short- or long-petiolate, more or less denticulate, bluntly toothed at base; cauline leaves (2)4–8 (coefficient of leafiness 0.10), lower leaves oblong to ovate- or rhombic-lanceolate, abruptly narrowed to petiole, others abruptly reduced, lanceolate to linear, more or less elongated, sessile, upper leaves often small, turning into bracteal leaves, shallowly or deeply serrate with 3–4 (or more) teeth, hairy or more or less glabrous above, beneath or on both sides stellate-hairy. Inflorescence openly paniculate, with 10–20 capitula; peduncles with small bracteal leaves, sparsely or scatteredly hairy, in upper part (below capitula) with quite small glands (sometimes without hairs and glands),



tomentose. Involucres 8–9 mm long, ovate; involucral bracts subobtusate or acute, sparsely or moderately hairy and glandular, almost without stellate hairs, green. Stigmas yellow, later turning dark. Flowering July to August.

Forests, evidently in all western districts of European Part of Soviet Union.—*European Part*: Baltic Region (south), Upper Volga, Upper Dnieper, Upper Dniester. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Bohemia. Type in Prague.

Cycle 10. *Bichloricoloria* Juxip.—Plants with small coefficient of leafiness (0.14–0.10); leaves almost entire; stigmas dark; stellate hairs on involucral bracts nearly absent or sparse.

127. ***H. trichobrachium* Juxip** in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 473.

Perennial. Stem 40 cm high, 2 mm in diameter, at base violet, scatteredly short-pubescent, more or less glabrous upward. Basal leaves withering before anthesis; cauline leaves 5–6 (coefficient of leafiness 0.14), narrowly lanceolate (11:1), to 11 cm long, almost entire, above glabrous, beneath with scattered, short hairs 0.5 mm long. Inflorescence paniculate, with 4–6 capitula; peduncles moderately covered with hairs 1.5 mm long and occasional, glands 0.3 mm long, tomentose. Involucres 10 mm long; involucral bracts obtuse, dark, sparsely (23) covered with stiff bristles 1 mm long and occasional (9), very small, glands 0.2–0.1 mm long, without stellate hairs. Stigmas dark. Flowering July.

European Part: Dvina-Pechora. Endemic. Described from Pechora District. Type in Leningrad.

Note. It differs from *H. bichloricolor* Ganesch. and Zahn by its distinctly hairy peduncles and range.

117 128. ***H. bichloricolor* Ganesch. and Zahn** in Schedis HFR, VII (1911) 98; Tr. Pochv.-Bot. E'ksp. II, 5, 153; Zahn in Pflzr. IV, 280, 883.—**Exs.**: GRF No. 2230.

Perennial. Stem 30–85 cm high, 1.5–3 mm in diameter, at base violet, uniformly sparsely hairy, tomentose above. Basal and lowermost cauline leaves withering before anthesis; cauline leaves 7–12 (coefficient of leafiness 0.13), lanceolate, gradually reduced upward, lower leaves narrowed to long, winged petiole, above nearly glabrous, beneath with occasional hairs 0.5–1.5 mm long, middle with short, winged petiole or sessile, upper linear-lanceolate, transitional to bracteal leaves; all leaves denticulate, occasionally with 1–4 conspicuously remote teeth, bluish-green above, paler beneath. Inflorescence paniculate, with (–)6–16(–20) capitula; peduncles with occasional hairs

1 mm long, eglandular. Involucres 8–9 mm long, ovate, later truncate; involucre bracts more or less broad, acuminate, with sparse, 25(19–33), hairs 1 mm long and sparse, 12(10–14), tiny glands 0.3 mm long, sparsely stellate hairy. Stigmas dark. Flowering July to August. (Plate X, Fig. 2.)

Birch-pine and pine forests.—*Eastern Siberia*: Angara-Sayans. Endemic. Described from former Balagan District. Type in Leningrad.

129. **H. dagoense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 473.

Perennial. Stem 60 cm high, 2 mm in diameter, at base violet, moderately pubescent with hairs 2.5 mm long, glabrous above. Basal leaves mostly withering before anthesis or one leaf persisting, obovate long-petiolate, obtuse, entire, moderately hairy; cauline leaves 8 (coefficient of leafiness 0.13), remote, gradually reduced upward, two lower leaves oblong-obovate, long-petiolate, more or less obtuse, entire, successive leaves lanceolate, short-petiolate to sessile, short-toothed or with one pair of larger teeth in middle of lamina, acute, sparsely pubescent beneath and along margin above, with hairs 0.6–1.2 mm long, along midrib densely hairy with hairs 1.5 mm long. Inflorescence paniculate, with 3–6 capitula; peduncles without simple hairs, eglandular, scatteredly stellate-hairy. Involucres 9.5 mm long; involucre bracts narrow, acute, without simple hairs (sometimes with few hairs) with sparse, 18(10–30), glands 0.4 mm long, scatteredly stellate-hairy. Stigmas dark. Flowering June to July.

Forest edges, meadows with half-overgrown forest.—*European Part*: Baltic Region. Endemic. Described from Hiiuamaa Island (Dagö). Type in Leningrad.

Note. It links the sections *Vulgata* and *Tridentata*. From *H. bichloricolor* Ganesch. and Zahn, it is distinguished by the absence of simple hairs on the involucre bracts and the range (endemic to Baltic Region).

- 118 **Section 9. Prenanthoidea** Koch in Synopsis, 2, II (1844) 528; Lbg. in Hartm. Handb. Scand. Fl. ed. 11, 50; Peter in Pflanzenfam. IV, 5, 384; Zahn in Pflzr. IV, 280, 35, 747; in Asch. and Graebn. Synopsis, XII, III, 277.—Plants tall; cauline leaves numerous; inflorescence paniculate, usually with many capitula, densely glandular, less often also hairy; involucre bracts multiserial, more or less regularly imbricate. For further characteristics see the key.

Apparently, this unusual section originates from the parallel *Umbellata* of the ancient prototype. During independent evolution it nevertheless formed offshoots in the direction of almost all the other

sections of the subgenus *Euhieracium*, which in all probability are species of hybrid origin. The members of *Prenanthoidea* grow in vast area from Greenland to Eastern Siberia but are absent on the one hand in the Arctic and on the other hand in the southernmost parts of the Mediterranean Region. In the USSR, this section shows interesting features of "insular" distribution. Such "islands" are: 1) Karelia-Lapland, with Ladoga-Ilmen and the eastern part of the Estonian SSR; 2) Urals; 3) Caucasus; 4) Altai and Angara-Sayan districts in the Siberia region; and 5) Soviet Central Asia; in the other regions members of this section apparently are entirely absent.

Prenanthoidea are mainly montane (to high altitude) plants, growing in alpine and subalpine meadows, elfin forests and forest edges, in northern regions descending lower, growing on hills and in relict forests (in the terminology of S.S. Ganeschin).

The type species of the section, *H. prenanthoides* Vill. *Prosp.* (1779) 35, described from France, does not grow in the USSR.

1. Inflorescence usually densely or even very densely glandular; cauline leaves (mainly middle) mostly distinctly panduriform, i.e. constricted from expanded, amplexicaul base and then lanceolate-broadened, acuminate, less often simply amplexicaul, lanceolate22.
- + Leaves only sometimes somewhat panduriform, mostly only broadly or narrowly lanceolate, more or less amplexicaul; in habit resembling *Umbellata*, *Tridentata*, or *Foliosa*, but with more or less conspicuous to sometimes dense glands in inflorescence, glands mainly or exclusively concentrated on involucre bracts.....2.
2. Glands concentrated almost exclusively on involucre bracts, entirely absent on peduncles or only few.....3.
- + Besides on involucre bracts, glands also on peduncles in more or less considerable number, sometimes, besides that, also on stem below inflorescence.....22.
3. Glands on involucre bracts sparse (15-25); hairs absent or few4.
- 119 + Glands on involucre bracts scattered to dense (30-90).....6.
4. Peduncles eglandular.....5.
- + Peduncles with occasional, very small (0.1-0.2 mm-long) glands; leaves panduriform, almost entire; plants tall (up to 90 cm) (Soviet Central Asia and Southern Caucasus).....131. **H. regelianum** Zahn
5. Involucre bracts without stellate hairs. Leaves somewhat panduriform, entire; plants of medium height (up to 50 cm) (Kola Peninsula).....134. **H. pruiniferum** Norrl.

- + Involucral bracts very densely stellate-hairy. Leaves lanceolate, coarsely serrate (Western Siberia).....141. **H. kusnetzkiense** Schischk. and Serg.
- 6. Glands on involucral bracts scattered to moderate (30–60).....7.
- + Glands on involucral bracts dense (80–100).....19.
- 7. Involucral bracts glabrous or some bracts with occasional hairs.....8.
- + Involucral bracts hairy (even though hairs few).....12.
- 8. Peduncles eglandular (or with occasional glands).....9.
- + Peduncles with sparse or scattered glands.....10.
- 9. Coefficient of leafiness 0.25; leaves more or less glabrous, almost entire; involucral bracts broad, obtuse.....139. **H. conicum** Arv.-Touv.
- + Coefficient of leafiness 0.33; leaves sparsely hairy, finely serrate (upper third of margin entire); involucral bracts subacute.....144. **H. teberdense** Litw. and Zahn.
- 10. Peduncles glabrous; leaves more or less entire; morphologically resembling *H. umbellatum* (North).....133. **H. amphileion** Pohle and Zahn
- + Peduncles with sparse or scattered hairs; leaves toothed; glands on involucral bracts alternately large and small, 0.3–1 mm long.....11.
- 11. Involucral bracts with 30–40 glands; stigmas dull-green (Western Siberia).....140. **H. neroikense** Juxip
- + Involucral bracts with 50–70 glands; stigmas dark (Caucasus).....143. **H. coniciforme** Litw. and Zahn
- 12 (7). Peduncles more or less eglandular.....13.
- + Peduncles with few or scattered glands.....17.
- 13. Peduncles sparsely hairy; involucre large, 13–15 mm long (North).....135. **H. arctogeton** Zahn
- + Peduncles glabrous.....14.
- 120 14. Involucral bracts with very sparse stellate hairs. Leaves lanceolate, more or less entire, glabrous above, densely hairy beneath; inflorescence with fewer capitula (Kola Peninsula).....138. **H. oswaldii** Norrl.
- + Involucral bracts conspicuously stellate-hairy.....15.
- 15. Leaves on both sides stellate-hairy (Caucasus).....145. **H. asterodermum** Woron and Zahn
- + Leaves without stellate hairs (or very sparse beneath, mainly along midrib).....16.
- 16. Leaves with rare short teeth, almost glabrous (Western Siberia).....137. **H. veresczaginii** Schischk. and Serg.
- + Leaves more or less entire, lanceolate (5.7:1); scattered-hairy above, moderately hairy beneath (Eastern Siberia).....130. **H. tunguskanum** Ganesch. and Zahn

- 17 (12). Involucral bracts usually without stellate hairs; glands and hairs on peduncles occasional or absent (North).....136. **H. crocatum** Fr.
 + Involucral bracts distinctly stellate-hairy; glands on peduncles few 18.
18. Peduncles glabrous or with occasional hairs; leaves scattered-hairy but without stellate hairs (Western Siberia, Altai and Soviet Central Asia).....142. **H. krylovii** Nevski
 + Peduncles moderately hairy; leaves stellate-hairy at least beneath or on both sides (Caucasus).....146. **H. lespinassei** Kozl. and Zahn
- 19 (6). Involucral bracts glabrous; leaves glabrous above, scattered-hairy beneath; glands on involucral bracts quite large (to 0.7 mm long); in habit resembling *H. umbellatum*.....149. **H. zinserlingianum** Juxip
 + Involucral bracts with occasional (1–10) hairs and small glands (0.1–0.4 mm long).....20.
20. Peduncles entirely eglandular; leaves broad, 2.5:1, slightly denticulate; stem at base and leaves moderately covered with long (3–4 mm) bristles (Caucasus).....132. **H. raddeanum** Zahn
 + Peduncles with occasional glands.....21.
21. Leaves lanceolate (5:1), with occasional hairs on both sides.....148. **H. vischerae** Juxip
 + Leaves narrowly lanceolate (7.5:1), moderately hairy above, densely beneath (Kola Peninsula).....147. **H. kaczurinii** Juxip
- 22 (1). Involucral bracts with scattered to moderate (30–60) glands.....23.
 121 + Involucral bracts with dense to very dense (80–175) glands.....25.
23. Stigmas yellow; peduncles moderately glandular; involucral bracts conspicuously stellate-hairy; leaves (lower) densely hairy (Kola Peninsula).....155. **H. imandrense** Juxip
 + Stigmas dark; involucral bracts with only occasional hairs; peduncles with scattered glands.....24.
24. Peduncles glabrous; leaves denticulate or more or less entire (Caucasus).....154. **H. strictissimum** Froel
 + Peduncles with conspicuous hairs, 1 mm long; leaves entire (Kola Peninsula).....152. **H. reducatum** Norrl.
25. Involucral bracts with dense glands.....26.
 + Involucral bracts with very dense (150–170) glands (Caucasus)39.
26. Involucral bracts glabrous or with only occasional hairs.....27.
 + Involucral bracts with appreciable number (15–25) of hairs.....38.
27. Involucral bracts entirely glabrous or with occasional hairs (in varieties).....28.
 + Involucral bracts always with occasional hairs.....33.
28. Coefficient of leafiness very low (0.10) for the section; glands on peduncles dense; involucral bracts without stellate and simple hairs; leaves entire, moderately hairy.....164. **H. kovdaense** Juxip

- + Coefficient of leafiness higher (0.17–0.35).....29.
- 29. Coefficient of leafiness comparatively low (0.17–0.23); morphologically resembling *Prenanthea* (leaves somewhat panduriform and inflorescence densely glandular), but corymbose inflorescence makes it similar to *H. murorum* s. l. (subsection *Jurana*); involucre bracts glabrous.....30.
- + Coefficient of leafiness higher (0.24–0.35).....31.
- 30. Leaves entire; involucre bracts sparsely stellate-hairy.....151. **H. pseudojuratum** Arv.-Touv.
- + Leaves coarsely or finely toothed; involucre bracts almost without stellate hairs or coarsely toothed with more or less dense stellate hairs (var. *acrostrum* Favre and Zahn).....150. **H. juratum** Fr.
- 31. Leaves moderately pubescent; peduncles with moderate or dense glands.....32.
- + Leaves densely pubescent, either densely on both sides or sometimes more or less glabrous above (var. *latifolium* Zahn), more or less entire or conspicuously serrate (var. *subdentatum* Zahn); involucre bracts and peduncles glabrous or with occasional hairs (subvar. *pilosquamum* Zahn); peduncles with very dense glands (Caucasus).....168. **H. perfoliatum** Froel.
- 122 32. Leaves mostly almost entire (very finely serrate) or rarely conspicuously serrate (f. *subdentatum* Zahn); peduncles and involucre bracts glabrous (f. *epilosum* Zahn) or with occasional hairs (f. *pilosiusculum* Zahn) (Caucasus).....159. **H. hypoglaucom** Litw. and Zahn
- + Leaves distinctly and sharply serrate, pubescence scattered (more or less glabrous above) to moderate or dense (f. *pilosius* Juxip); peduncles usually glabrous, sometimes with occasional hairs or with scattered hairs 2 mm long (f. *kusnetzovii* Juxip) (Western Siberia and Urals).....156. **H. suberectum** Schischk. and Steinb.
- 33 (27). Peduncles sparsely or moderately glandular.....34.
- + Peduncles densely glabrous.....35.
- 34. Peduncles glabrous or with occasional hairs; leaves to densely pubescent on both sides, entire to irregularly finely serrate.....160. **H. bupleurifolium** Tausch
- + Peduncles distinctly hairy like involucre bracts; leaves entire (Ladoga-Ilmen District).....153. **H. duderhofense** Juxip
- 35. Leaves as a whole to densely pubescent.....36.
- + Leaves as a whole to moderately pubescent.....37.
- 36. Peduncles with occasional hairs; middle and upper leaves broad (2.5:1), very finely serrate, more or less entire toward apex (Kola Peninsula).....157. **H. albocostatum** Norrl.

- + Peduncles glabrous; middle and upper leaves narrower (4–7:1), entire (Karelia).....158. **H. karelorum** Norrl.
37. Leaves alternately finely and coarsely toothed; middle leaves broad (3:1) (Carpathians and Caucasus)....161. **H. bupleurifolioides** Zahn
- + Leaves entire, narrower (5:1) (Leningrad Region).....163. **H. multiglandulosum** Juxip
- 38 (26). Peduncles moderately glandular; leaves entire, moderately short-pubescent (hairs 0.5–1 mm long) (Ladoga-Ilmen District).....162. **H. meinshausenianum** Juxip
- + Peduncles with very dense glands; leaves finely serrate, moderately pubescent (along margin hairs 2.5 mm long) (Caucasus).....166. **H. loriense** Juxip
- 39 (25). Involucral bracts with occasional hairs; peduncles with dense glands but not with hairs; leaves as a whole with scattered pubescence; stem scatteredly pubescent, particularly in upper half.....167. **H. brittattense** Juxip
- 123 + Involucral bracts with scattered (26–38), hairs 2–2.5 mm long; peduncles with moderate glands but with dense hairs 2 mm long; leaves as a whole to densely pubescent; stem densely (particularly at base) covered with hairs 2 mm long.....165. **H. buschianum** Juxip

Subsection 1. Regeliana Juxip.—Members of this subsection are a connecting link between sections *Prenanthoidea* and *Foliosa*. Depending upon the closeness to one or the other sections, they have a large or small number of glands in the inflorescence and a higher or lower degree of hairiness of all parts. From *Foliosa* they differ by the presence of glands and hairs in the inflorescence as well as by a comparatively low coefficient of leafiness (not exceeding 0.40); and from *Prenanthoidea* and a small number of glands in the inflorescence and somewhat panduriform leaves (Siberia, Soviet Central Asia, and southern part of Caucasus).

Cycle 1. Tunguskana Juxip.—Habit resembling narrow-leaved members of *H. prenanthoides* s. l., but glands in inflorescence vary from sparse to scattered, and they are concentrated exclusively on involucral bracts; glands tiny, 0.2–0.3 mm long (Eastern Siberia).

130. **H. tunguskanum** Ganesch. and Zahn in Tr. Pochv.-Bot. E'ksp. II, 5 (1912) 159; Zahn in Pflzr. IV, 280, 937.

Perennial. Stem 30–85 cm high, 2–6 mm in diameter, violet and mostly sparsely covered at base with hairs 2 mm long, glabrous above, slightly tomentose. Basal leaves withering before anthesis; cauline leaves 15–35 (coefficient of leafiness 0.33), lanceolate, to 14 cm long (5.7:1), lower

leaves narrowed to petiole, middle with expanded or cordate, semiamplexicaul base, more or less entire (sometimes with one short tooth), acuminate, upper leaves abruptly reduced and transitional to bracteal leaves, scatteredly hairy, 6(0–16), above, moderately, 15(11–23), beneath, hairs 1 mm long. Inflorescence openly paniculate, with long, divergent branches, with 5–22 capitula; peduncles glabrous and eglandular, tomentose. Involucres 9–10 mm long, ovate, later truncate; involucre bracts subobtusate, with few (3) dark hairs 1 mm long, and moderate, 30(22–48), number of tiny glands 0.2–0.3 mm long, with quite dense stellate hairs. Stigmas dark. Flowering July to August. (Plate XIII, Fig. 1.)

Pine-deciduous forests and burns in taiga.—*Eastern Siberia*: Angara-Sayans. Endemic. Described from Angara Range. Type in Leningrad.

Note. According to Zahn (l. c.), this species is intermediate between sections *Foliola* and *Tridentata*. However, both the habit and the presence of a moderate number of glands on the involucre bracts compel us to refer this species to section *Prenanthoidea* (subsection *Regeliana* Juxip).

Cycle 2. *Regeliana* Juxip.—Leaves broad (2–4:1), more or less amplexicaul, somewhat panduriform, with reticulate venation beneath; inflorescence scatteredly or more or less densely glandular; peduncles weakly stellate-hairy (Soviet Central Asia and Southern Caucasus).

131. ***H. regelianum* Zahn** in Pflzr. IV, 280 (1922) 936; Grossh. Fl. Kavk. IV, 272.

Perennial. Stem 30–90 cm high, 2–5 mm in diameter, angular-sulcate, at base violet, mostly glabrous, sometimes more or less densely covered with hairs 2.5 mm long. Basal as well as lowermost cauline leaves withering before anthesis; cauline leaves 26(13–44) (coefficient of leafiness 0.38), lower oblong-lanceolate, semiamplexicaul, panduriform, others ovate-lanceolate, sessile, with expanded base (4:1), gradually becoming broader (2:1), acuminate, more or less entire, almost glabrous above, reticulately veined beneath, with few, 7(0–20), hairs 1–1.5 mm long, along midrib dense. Inflorescence openly paniculate, branched, with 14(5–35) capitula; peduncles slender, without simple hairs, with occasional, tiny glands 0.1–0.2 mm long, scatteredly stellate-hairy. Involucres 9(8–10) mm long; involucre bracts obtuse, dark, glabrous (sometimes with occasional hairs), with scattered, 24(8–57) tiny (0.1–0.4 mm-long) glands, more or less without stellate hairs. Stigmas dark or yellow. Flowering July to August.

Broad-leaved forest zone, spruce forests and subalpine meadows (to 2600 m).—*Caucasus*: Southern Transcaucasia; *Soviet Central Asia*:

Lake Balkhash Region, Dzhungaria-Tarbagatai, mountainous Turkmenia, Pamiro-Alai, Tien Shan. Described from Soviet Central Asia (Borgaty; A. Regel). Type in Leningrad.

Note. In all probability it grows also in Armenia-Kurdistan and the Iranian Region. Zahn considers it an intermediate species between the sections *Prenanthoidea* and *Foliosa*.

132. **H. raddeanum** Zahn in Izv. Kavk. Muzeia, VII, (1913) 136; Zahn in Pflzr. IV, 280, 937; Grossh. Fl. Kavk. IV, 272.

Perennial. Stem 40–60 cm high, 3.5 mm in diameter, densely covered, particularly at base, with hairs 3–8 mm long, eglandular. Basal as well as lower cauline leaves withering before anthesis; cauline leaves 16(11–21) (coefficient of leafiness 0.33), broad (2.6:1), sessile, ovate-lanceolate, amplexicaul, weakly denticulate, moderately covered with hairs 2.5–4 mm long (longer in upper part). Inflorescence paniculate, with 3–5 capitula; peduncles more or less glabrous and eglandular. Involucres 10.5–11 mm long; involucre bracts with occasional, 10(7–11), hairs 1–2 mm long, but densely, 64(44–84), glandular with glands 0.1–0.3 mm long. Stigmas turning brown. Flowering August.

125 *Caucasus*: Eastern Transcaucasia. *General distribution*: Armenia-Kurdistan. Described from Georgia (Manglis). Type in Tbilisi.

Note. According to Zahn (l. c.), it is an intermediate species between sections *Prenanthoidea* and *Foliosa*.

Subsection 2. Aestiva Juxip.—*Umbellata*—*Prenanthoidea* Zahn in Pflzr. IV, 280 (1922) 918. Inflorescence glandular (sparsely to scatteredly); cauline leaves 7–30, middle sessile, with rounded semiamplexicaul base and reticulate venation beneath.

Cycle 3. Crocata Juxip—*Grex H. crocatum* (Fr.) Zahn in Pflzr. IV, 280 (1922) 922.—Cauline leaves to 20.

133. **H. amphileion** Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 144; Pflzr. IV, 280, 924.

Perennial. Stem glabrous, branched from middle. Basal leaves withering before anthesis; cauline leaves 16, lanceolate, sessile with tapered or uniformly broad base, acuminate, more or less entire or with remote fine teeth, light green, pale green beneath with indistinct reticulate venation, along margin and midrib sparsely hairy (later scabrous from spinules). Inflorescence paniculate-umbellate, with 15 (or more) capitula; peduncles glabrous, with sparse glands and tomentose. Involucres 10 mm long, cylindrical-ovate; involucre bracts subobtusate, dark, glabrous, but very densely glandular, without stellate hairs.

Florets often tubular; stigmas dark; in habit resembling *H. umbellatum*. Flowering August.

Pine forests.—*European Part*: Dvina-Pechora. Endemic. Described from Arkhangelsk Region (from Mezen and Zolotitsa rivers). Type unknown.

Note. According to Zahn, it also includes, as a subspecies, *H. schennikovii* Zahn nom. nud. from the Vologda Region.

134. ***H. pruiniferum*** Norrl. Hier. Herb. Mus. Fenn. ed. 2 (1889) 146; Norrl. in Mela-Cajander, Suom. Kasvio, 738; Zahn in Pflzr. IV, 280, 924 (nota).—**Exs.**: Norrl. Hier. exs. fasc. VIII, No. 95.

Perennial. Stem 20–50 cm high, more or less glabrous. Basal leaves withering before anthesis; cauline leaves 7–17 (coefficient of leafiness 0.30), lanceolate, lower leaves petiolate, to 8 cm long, middle sessile, with expanded, more or less semiamplexicaul base, somewhat panduriform, abruptly acuminate (6:1), upper leaves abruptly reduced, lanceolate, with rounded base, all leaves entire, more or less glabrous, light green above, bluish-green beneath. Inflorescence umbellate, with 1–4 capitula; peduncles without simple hairs, eglandular, with stellate hairs. Involucres 8.5–10 mm long; involucral bracts subacute, dark,
 126 glabrous (sometimes with 1–2 hairs at base), but with sparse (15–20), tiny glands 0.3 mm long, and without stellate hairs. Corolla teeth eciliate; stigmas black. Flowering July to August.

On rocks, in birch forests.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia (Finland). Endemic. Described from Karelia. Type in Helsinki.

Note. According to Zahn, *H. ingermanicum* Zahn nom. nud. is also closely related to this species, which was discovered by L. Litwinov in the Luzha District of the Leningrad Region. We were unable to examine this plant.

135. ***H. arctogeton*** Zahn in Pflzr. IV, 280 (1922) 924.—*H. angustiforme* Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 144, non Dahlst.

Perennial. Stem up to 65 cm high, sturdy, at base black-violet, mostly glabrous, sparsely hairy above with short hairs (0.5 mm long). Basal and lower cauline leaves withering before anthesis; cauline leaves to 20 (coefficient of leafiness 0.30), lower leaves lanceolate, acute, sessile, gradually reduced, others broader, acute with rounded semiamplexicaul base, somewhat toothed, glabrous above, along margin with hairs 1–2 mm long or scabrous from spinules (resembling glands), sparsely pubescent beneath, along midrib more densely so, middle and upper leaves less hairy but on both sides with scattered

stellate hairs, light green, paler beneath, with inconspicuous reticulate venation. Inflorescence paniculate-umbellate, branched; peduncles sparsely hairy, more or less eglandular, gray from stellate hairs. Involucres large, 13–15 mm long, broadly ovate; involucre bracts blackish-green, obtuse, with occasional hairs, but very densely glandular, without stellate hairs. Stigmas dark. Flowering July.

Seaside meadows.—*European Part*: Dvina-Pechora. Endemic. Described from Pushlakhta near White Sea. Type unknown.

136. **H. crocatum** Fr. Symb. (1848) 183; Epicr. 124; Norrl. in Mela-Cajander, Suom. Kasvio, 737; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 630; Zahn in Pflzr. IV, 280, 922.—*H. crocatum* Lbg. in Blytt. Norg. Fl. II (1874) 678 and in Hartm. Handb. Scand. Fl. ed. 11 (1879) 55.—*H. friesii* Fr. Hier. Europ. No. 154.—**Exs.**: Norrl. Hier. exs. fasc. VIII, Nos. 91–93.

Perennial. Stem 20–70 cm high, 2–3 mm in diameter, more or less glabrous. Basal leaves withering before anthesis; cauline leaves 8–20 (coefficient of leafiness 0.32), lanceolate (6:1), to 14 cm long, sessile, middle leaves semiamplexicaul, acuminate, denticulate, more or less glabrous, dark green, pale glaucescent beneath, with indistinct reticulate venation. Inflorescence paniculate-umbellate, with 2–9 capitula; peduncles glabrous (or with occasional hairs 1–1.5 mm long) but with few glands 0.3 mm long, scatteredly stellate-hairy. Involucres 9.5–11.5 mm long; involucre bracts lanceolate, 2 mm wide, obtuse, dark green to blackish, sparsely, 11(5–18), hairy with hairs 1–2 mm long and with scattered glands 0.3 mm long, 31(16–40), glands, almost without stellate hairs. Florets intensive saffron-yellow; stigmas dark. Flowering August. (Plate XIV, Fig. 1.)

Clay bluffs, sand dunes, seaside meadows, riverbanks and mountain cliffs.—*European Part*: Arctic, Karelia-Lapland, Upper Volga (Moscow Region, park in Gorenki, probably introduced). *General distribution*: Scandinavia, Atlantic Europe. Described from Sweden. Type in Uppsala?

Note. According to Fries (Epicr. 125) *H. crocatum* is said to be found in the Urals and in Siberia along the Yenisei, in Olekminsk in the Irkutsk Region and as far as Kamchatka (Zahn, l. c.), but, apparently, broad-leaved forms of *H. umbellatum*, for example *H. arctophilum* Fr., have been mistaken for it.

137. **H. veresczaginii** Schischk. and Serg. in Sistem. Zam. po Mat. Gerb. im. Krylova pri Tomsk. Univ. 1–2 (1949) 20; Krilov, Fl. Zap. Sib. XI, 3057.

Perennial. Stem 55–70(–100) cm high, glabrous or with rare hairs, above with stellate hairs. Basal leaves withering before anthesis; cauline leaves 20–42 (coefficient of leafiness 0.40), oblong-ovate and ovate-lanceolate (5:1), to 11 cm long, at base rounded (but not cordate), with acuminate apex, along margin with (3–)5–7 short sharp teeth, sometimes almost entire, more or less glabrous or with occasional hairs along midrib beneath. Inflorescence paniculate, with 9 capitula; peduncles without simple hairs and glands, more or less densely stellate-hairy. Involucres 9 mm long; involucral bracts lanceolate, subacute, with occasional (5–7), light hairs 1 mm long and scattered (30–60), glands 0.4–0.2 mm long, more or less densely stellate-hairy. Stigmas dark. Flowering July to August.

Pine-birch forests in taiga.—*Western Siberia*: Altai. Endemic. Described from Altai. Type in Tomsk.

Note. The description (l. c.) indicates that the species is distinguished by an “almost complete absence of blackish glandular hairs on the involucre,” whereas on the authentic specimen studied by us, the involucral bracts had no less glands than in *H. krylovii*.

138. *H. oswaldii* Norrl. in Mela-Cajander, Suom. Kasvio (1906) 738; Zahn in Pflzr. IV, 280, 901 (nota).

Perennial. Stem 40–70 cm high, 2.5 mm in diameter, glabrous. Basal as well as lower cauline leaves withering before anthesis; cauline leaves 15–20 (coefficient of leafiness 0.33), lanceolate (5:1), to 10 cm long, more or less entire, lower leaves narrowed to uniformly broad petiole, middle and upper with round, expanded base, acuminate, glabrous above, densely short-hairy beneath with hairs 1–1.5 mm long and weakly stellate-hairy (the higher the leaves the less hairy). Inflorescence paniculate-umbellate, with 3–5 capitula; peduncles glabrous and eglandular or later with occasional glands, tomentose. Involucres 10–11 mm long; involucral bracts obtuse, dark, with occasional (2–7), dark hairs 0.3–0.5 mm long, with light tips and scattered, 36(30–50), tiny glands 0.3–0.1 mm long, and very sparse stellate hairs. Stigmas dark. Flowering July to September.

Mountain slopes, above forest limits, edges of pine-birch forests.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region. Type in Helsinki.

Cycle 4. Aestiva Juxip—*Grex H. aestivum* (Fr.) Zahn in Pflzr. IV, 280 (1922) 918.—Cauline leaves 20–45.

139. *H. conicum* Arv.-Touv. in Bull. Soc. Dauph. IV (1877) 188; Hier. Alp. fl. 116; Sudre, Hier. du Centre de la France, t. VIII, 38; Zahn,

Hier. Schweiz. 525; Zahn in Pflzr. IV, 280, 924; Zahn in Asch. and Graebn. Synopsis XII, III, 506.—Exs.: Arv.-Touv. Soc. Dauph. Nos. 1722, 4950.

Perennial. Stem 50–100(–130) cm high, thickish, at base somewhat setose (often scabrous in upper half from spinules), often reddish. Basal and lower cauline leaves withering before anthesis; cauline leaves (10–)15–20(–30) (coefficient of leafiness 0.25), oblong-lanceolate to lanceolate, lower leaves narrowed to petiole, others broadly lanceolate to elliptic-lanceolate, sessile, with broad, somewhat amplexicaul base, acuminate, barely denticulate or with 1–2 deep teeth, glabrous or scabrous from bristles and spinules, stellate-hairy, light green, paler beneath, with conspicuous reticulate venation. Inflorescence paniculate, with 10–40 capitula; peduncles glabrous and eglandular (or with very sparse hairs and glands), grayish from stellate hairs. Involucres 10–12 mm long, ovate; involucre bracts dark, obtuse, without simple hairs but moderately, finely (and coarsely, alternately) glandular, slightly stellate-hairy. Stigmas dark to black; corolla teeth eciliate. Achenes light- or chestnut-brown. Flowering August.

European Part: Upper Dniester; *Caucasus*: Ciscaucasia, Eastern, Western, and Southern Transcaucasia. *General distribution*: Scandinavia, Central Europe, Atlantic Europe, Mediterranean Region, Balkans-Asia Minor. Described from France (Dauphine). Type unknown.

Note. This species is intermediate between sections *Umbellata* and *Prenanthoidea*, growing wherever members of the above-mentioned sections are found. From *H. umbellatum* it is distinguished by glandular involucre bracts and peduncles and by somewhat amplexicaul leaves with reticulate venation on the underside.

The following subspecies are also referred here: *H. valdefrondosum* Maly and Zahn (= *β. subvaldefrondosum* Maly and Zahn on Verh. 129 Zool.-Bot. Ges. Wien (1904) 296).—with stems densely soft-hairy at base; cauline leaves 25–30, with scattered short hairs on peduncles and involucre bracts—in Transcaucasia, and *H. hryniawiense* (Wol.) Zahn—peduncles and involucre bracts glabrous, involucre bracts with very dense glands, but peduncles eglandular—in Galicia.

140. *H. neroikense* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 474.

Perennial. Stem 80 cm high, 5 mm in diameter, at base violet, more or less glabrous but with occasional tiny glands 0.2 mm long below inflorescence. Basal leaves withering before anthesis; cauline leaves 24 (coefficient of leafiness 0.30), lanceolate, with rounded base, sessile (4:1), denticulate with up to 10 teeth, 2–3 mm long, olive-green above, bluish-green, more or less glabrous beneath, somewhat arachnoid.

Inflorescence paniculate, with 40 capitula (some undeveloped); peduncles with occasional simple hairs and sparse, glands 0.3 mm long, with scattered stellate hairs. Involucre 10 mm long; involucre bracts dark, glabrous (or with 1–2 hairs at base), and scattered, 33(30–40), glands 0.3–1 mm long (longer at the base and shortening towards apex), without stellate hairs. Stigmas dull green. Flowering August.

In (burned) forests on steep mountain slopes.—*European Part*: Volga-Kama (central and southern Urals); *Western Siberia*: Ob' Region. Endemic. Described from basin of Severnaya Sosva River. Type in Leningrad.

Note. It is distinguished from the closely related species *H. conciforme* Litw. and Zahn by involucre bracts with scattered glands, greenish stigmas, and range.

141. **H. kusnetzkiense** Schischk. and Serg. in Sistem. Zam. po Mat. Gerb. im. Krylova pri Tomsk. Univ. 1–2 (1949) 20; Krylov. Fl. Zap. Sib. XI, 3056.

Perennial. Stem 60–90 cm high, with scattered hairs or glabrous, with stellate hairs above. Basal leaves and lowermost cauline leaves withering before anthesis; cauline leaves to 30 (coefficient of leafiness 0.30), middle and upper leaves ovate-lanceolate or ovate, sessile (4.5:1), to 15 cm long, with slightly cordate base; all leaves coarsely or more or less sinuately and sharply serrate, almost glabrous, weakly stellate-hairy beneath. Inflorescence openly paniculate with 20 (approximately) capitula, partly undeveloped; peduncles without hairs and eglandular (or with few glands and hairs). Involucre 9 mm long; involucre bracts subacute, without simple hairs, but with occasional (to sparse) (14–21) glands 0.5–0.2 mm long, very densely stellate-hairy. Stigmas dark. Achenes to 3.5 mm long. Flowering July to August.

River valleys.—*Western Siberia*: Ob' Region, Irtysh. Endemic. Described from the Kuznetsk Alatau. Type in Tomsk.

130 142. **H. krylovii** Nevski in sched.; Fl. Zap. Sib. XI, 3055.—*H. prenanthoides* Kryl. Fl. Alt. III (1904) 769, non Vill.

Perennial. Stem 40–70 cm high, at base reddish-violet, with scattered hairs 2 mm long, particularly at base, sometimes entirely glabrous. Basal leaves withering before anthesis; cauline leaves 18(7–27) (coefficient of leafiness 0.30), oblong, lanceolate or ovate-lanceolate (5:1), to 13 cm long, lower leaves narrowed to petiole, middle and upper with cordate amplexicaul base, acuminate, almost entire, less often with fine teeth at base, with occasional hairs on both sides (sometimes glabrous above), sparsely hairy along midrib beneath and margin with hairs 1–1.5 mm long (rarely leaves on both sides conspicuously pilose,



f. *pilosius* Juxip). Inflorescence corymbose-paniculate, with 11(3–25)42 capitula; peduncles with or without occasional hairs and sparse glands, 0.3 mm long, with scattered stellate hairs. Involucres 8.5–10.5 mm long; involucre bracts more or less obtuse, with occasional, 3(0–8) (–14), hairs 1 mm long and scattered, 39(21–62), glands 0.3–0.5 mm long, or glands large (up to 1 mm long)—f. *gorczakovskianum* m., with densely stellate hairs. Stigmas dark. Achenes to 4 mm long. Flowering July to August.

Dark coniferous forests, alpine and subalpine meadows, cedar and birch forests, mountain slopes, to 2600 m.—*European Part*: Middle Urals (f. *gorczakovskianum* m.); *Western Siberia*: Altai, Irtysh, Angara-Sayans; *Soviet Central Asia*: Tien Shan, Dzhungaria-Tarbagatai. Endemic. Described from Altai. Type in Leningrad.

143. **H. coniciforme** Litw. and Zahn in Fedde, Repert. IV (1907) 248; Zahn in Pflzr. IV, 280, 924.

Perennial. Stem 50–70 cm high, sturdy, angular-sulcate, at base woody and somewhat hairy, more or less glabrous above. Basal as well as lower cauline leaves withering before anthesis; cauline leaves to 25 (coefficient of leafiness 0.36), broadly lanceolate, acuminate, gradually reduced upward, lower leaves somewhat tapered toward base and slightly amplexicaul, others sessile, with rounded semiamplexicaul base, unequally denticulate or sometimes with large teeth, lower leaves sparsely hairy above, others usually glabrous, along margin conspicuously ciliate or spinulose, scatteredly (on midrib somewhat more densely) short-hairy beneath, without stellate hairs, grass-green, paler beneath with conspicuous reticulate venation. Inflorescence paniculate-umbellate, branched, with 30 capitula, partly undeveloped; peduncles sparsely hairy, with scattered glands, gray from stellate hairs. Involucres 10–12 mm long, globose-ovate, later truncate; involucre bracts blackish, subacute, glabrous but with very dense, tiny (alternating with larger) glands (with yellow heads), only at base with sparse stellate hairs. Stigmas dark; corolla teeth ciliate. Achenes dark brown. Flowering July to August.

Caucasus: Ciscaucasia. Endemic. Described from Beshtau Mountain. Type unknown.

144. **H. teberdense** Litw. and Zahn in Fedde, Repert. IV (1907) 247; Zahn in Pflzr. IV, 280, 902.—*H. teberdense* var. *β. pilosiceps* Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 14.—(?) *H. corymbosum* Fr. Symb. (1848) 186.—*H. valesiacum* Peter and *H. lycopifolium* Peter, Beitr. Hier. Osteur. Orient. (1898) 33, nec Fr., non Froel.

Perennial. Stem up to 80 cm high, 3 mm in diameter, sturdy, sulcate, often red-violet, more or less glabrous or in lower part sparsely short-hairy, densely stellate-hairy above. Basal and lower cauline leaves withering before anthesis; cauline leaves 24–30 (coefficient of leafiness 0.33), gradually reduced, lower leaves oblong-lanceolate (7.5:1), long-petiolate, others oval-lanceolate, sessile, broad (4.5:1), with rounded semiamplexicaul base, acuminate, with small, sharply serrate teeth (top third entire), grass-green above, glaucescent beneath, mostly glabrous above, with occasional short hairs beneath. Inflorescence paniculate-umbellate, with (8–)15–30 capitula, partly undeveloped; peduncles without hairs or with occasional simple hairs (var. *pilosiceps* Zahn), and glands 0.3 mm long, scattered-tomentose. Involucres 10 mm long, ovate; involucral bracts more or less obtuse or subacute, dark green, almost always glabrous or with occasional hairs (var. *pilosiceps* Zahn), with scattered (42) glands to 0.5 mm long, sparsely stellate-hairy. Stigmas dark. Flowering August.

Mountain slopes.—*Caucasus*: Ciscaucasia, Eastern and Western Transcaucasia. Endemic. Described from Teberda (var. *pilosiceps* Zahn from Bakuriani). Type in Leningrad.

145. **H. asterodermum** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 21 (1912) 9; Zahn in Pflzr. IV, 280, 922.

Perennial. Stem to 50 cm high, sturdy, at base violet, short-pilose in lower half. Basal leaves withering before anthesis; cauline leaves 20 (coefficient of leafiness 0.40), lanceolate, lower leaves tapered toward base, others sessile (divergently spreading), with broad, rounded, sometimes semiamplexicaul base, toward apex gradually acuminate, denticulate or with remote teeth, with reticulate venation beneath, with revolute margin, green above, paler beneath, without simple hairs above, 134 sparsely short-ciliate beneath and along margin, with both sides stellate-hairy. Inflorescence paniculate, with 20 capitula; peduncles without simple hairs, eglandular, white-tomentose. Involucres 9–11 mm long; involucral bracts acute, sparsely hairy, also moderately short-glandular, at base grayish-tomentose, above sparsely stellate-hairy. Stigmas dark; ligule teeth eciliate. Achenes dark brown. Flowering August.

Caucasus: Western Transcaucasia. Endemic. Described from Bodysk (Batumi). Type unknown.

146. **H. lespinassei** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 15; Zahn in Pflzr. IV, 280, 920.

Perennial. Stem 60 cm high, at base more or less glabrous, densely hispid from middle to top and below inflorescence somewhat glandular.

Basal leaves withering before anthesis; cauline leaves 25 (coefficient of leafiness 0.40), elliptic- or oblong-lanceolate, middle leaves crowded, with broad, rounded or slightly cordate, amplexicaul base, upper more or less ovate, short-acuminate; all leaves more or less entire or with few fine teeth, very short-hairy, but more or less glabrous above, lustrous, sparsely stellate-hairy, beneath (or on both sides). Inflorescence paniculate-umbellate, with (8-)15-25(-30) capitula; peduncles moderately hairy and somewhat glandular, tomentose. Involucres 10-11 mm long; involucre bracts obtuse, mostly sparsely pubescent and moderately glandular, at base densely stellate-hairy. Stigmas dark. Flowering August.

Caucasus: Eastern Transcaucasia. Endemic. Described from Bakuriani (Georgia). Type unknown.

147. **H. kaczurinii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 474.

Perennial. Stem 20-40 cm high, 2 mm in diameter, moderately covered with hairs 1.5 mm long, violet at base. Basal leaves, like lower cauline, withering before anthesis; cauline leaves 8-9 (coefficient of leafiness 0.28), narrowly lanceolate, tapered toward both ends, to 10 cm long (7.5:1), entire, densely pubescent; above moderately, beneath densely or moderately (but then glabrous above). Inflorescence paniculate-umbellate with 3-6 capitula; peduncles with occasional short hairs and few glands 0.2-0.3 mm long, tomentose. Involucres 8.5-9 mm long; involucre bracts 1.5 mm wide, obtuse, without hairs or with occasional (0-5), quite short hairs (0.5 mm long) and dense (80) glands 0.4 mm long, more or less without stellate hairs. Stigmas dark. Flowering August.

Tundra near coast.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region. Type in Kirovsk.

135 **Note.** From the closely related species (*Aestiva*) it is distinguished by having dense, tiny glands on the involucre bracts and narrowly lanceolate, densely hairy leaves. Kola Peninsula.

148. **H. vischerae** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 475.

Perennial. Stem 60-100 cm high, 3-6 mm in diameter, reddish at base and sometimes almost entirely, sparsely short-hairy (1 mm long), below inflorescence with occasional (0-5) tiny glands. Basal leaves withering before anthesis; cauline leaves 30(23-40) (coefficient of leafiness 0.40), lanceolate, amplexicaul, more or less entire (5:1), to 12 cm long, on both sides with occasional hairs 0.6-1 mm long (or glabrous above). Inflorescence paniculate, with 5-17 (or more) capitula,

partly undeveloped; peduncles almost glabrous or with occasional, short hairs to 1 mm long and few glands 0.3 mm long, with scattered stellate hairs. Involucres 8–10 mm long; involucre bracts more or less obtuse, with occasional, 3(0–7), short, hairs 0.8 mm long and dense, 80(65–110), glands 0.4 mm long, without stellate hairs. Stigmas dark. Flowering July to August.

Meadows along banks of rivers and streams, herb-spruce forests, clearings and edges of forests, mountain slopes.—*European Part*: Volga-Kama, Upper Volga. Endemic. Described from Urals. Type in Leningrad.

Note. It is distinguished from the related species *H. kaczurinii* Juxip by having broader, sparsely pubescent leaves.

149. **H. zinserlingianum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 475.

Perennial. Stem 95–120 cm high, 5 mm in diameter, more or less glabrous, violet at base. Basal leaves withering before anthesis; cauline leaves 36–40 (coefficient of leafiness 0.35), lanceolate, to 15 mm long (6–7:1), almost entire or with 3 teeth along margin, lower leaves narrowed to petiole, middle with rounded semiamplexicaul base, glabrous above, scatteredly pubescent beneath, hairs 1.5 mm long. Inflorescence paniculate-umbellate, with 10–18 capitula, partly undeveloped; peduncles glabrous, eglandular (or with occasional glands and hairs), tomentose. Involucres 9.5–10 mm long; involucre bracts without simple hairs, but with large number (90) of quite large glands (to 0.7 mm long), very sparsely stellate-hairy. Florets yellow; stigmas brown. Flowering July to August.

Spruce and birch forests.—*European Part*: Ladoga-Ilmen, Volga-Kama (Urals). Endemic? Described from Leningrad Region (Luga). Type in Leningrad.

Note. In plant habit it looks the same as *H. umbellatum* L., but is distinguished by the abundant glands on the involucre bracts, which are quite visible under high magnification in incident light.

136 *Subsection 3. Jurana* Juxip—*H. prenanthoides-murorum* Zahn in Pflzr. IV, 280 (1921) 777.—In plant habit resembling *H. prenanthoides* (s. l.), but nature of inflorescence suggests *H. murorum* (s. l.) and length of involucre is usually shorter; basal leaves 0–3; cauline leaves 6–18, middle ones panduriform; inflorescence usually densely glandular.

Cycle 5. Jurana Juxip—*Grex H. juranum* (Fr.) Zahn in Pflzr. IV, 280 (1921) 784.—Basal leaves 1–3; cauline leaves 6–12(15), mostly toothed; leaves shorter than in next cycle.

150. **H. juranum** Fr. Symb. (1848) 129; Epicr. 104; Zahn in Koch, Synopsis, 3, III, 1878; Zahn in Pflzr. IV, 280, 786.—*H. eujuranum* (Fr.) Zahn in Asch. and Graebn. Synopsis, XII, III (1937) 333.—*H. gracile* Froel. in DC. Prodr. VII (1838) 231; non Hook.—*H. jurassicum* Arv.-Touv. Catalog (1913) 366.—*H. stenoplectum* Arv.-Touv. in sched.—Exs.: Arv.-Touv. and Gaut. Hierac. Gallica, Nos. 1507, 1508; Fl. exs. Austro. Hung. No. 3376.

Perennial. Stem 40–80 cm high, slender, at base violet or spotted, hairy. Basal leaves withering before anthesis or 1–3 (rarely more), abruptly narrowed to long petiole, elliptic or oblong, more or less obtuse or acute, larger than cauline leaves; cauline leaves 6–12(–15) (coefficient of leafiness 0.17), broadly ovate-lanceolate, lower leaves petiolate, somewhat amplexicaul, middle somewhat panduriform, upper sessile with cordate base, acute, finely or coarsely (var. *acroastrum* Favre and Zahn) toothed, more or less pubescent above, beneath and along margin more conspicuously hairy, light green. Inflorescence corymbose-paniculate, with 3–12(–20) capitula; peduncles without simple hairs, but with dense, dark glands 0.3–0.5 mm long, weakly stellate-hairy. Involucres 9–10.5 mm long; involucre bracts obtuse, dark, without simple hairs but densely (60–80) glandular, with glands 0.2–0.5 mm long, almost without stellate hairs or more or less densely (var. *acroastrum* Favre and Zahn) hairy. Stigmas dark. Achenes reddish-brown (not black). Flowering July to August.

Open woodlands and scrubs, mountain meadows, 1500–2500 m.—*Caucasus*: Eastern and Southern Transcaucasia. *General distribution*: Central Europe, Mediterranean Region, Balkans-Asia Minor. Described from the Jura Range. Type in Uppsala?

Cycle 6. Pseudojurana Juxip.—Grex. *H. pseudojuranum* Arv.-Touv. Suppl. a Monogr. (1876) 24 pro sp.; Zahn in Pflzr. IV, 280, 778.—Basal leaves absent; cauline leaves 8–18, larger and broader (2–3:1), mostly entire.

151. **H. pseudojuranum** Arv.-Touv. Suppl. a Monogr. Hier. dauph. (1876) 24; Hier. Alp. fr. 92; Zahn in Koch, Synopsis, 3, III, 1878; Zahn in Pflzr. IV, 280, 780; Zahn in Asch. and Graebn. Synopsis, XII, III, 322.

137 Perennial. Stem to 80 cm high, more or less thick, more or less hairy. Basal leaves withering before anthesis, very rarely persistent (2–4); cauline leaves 8–18 (coefficient of leafiness 0.23), large, gradually reduced upward (4–6:1), oblong-elliptic or ovate-lanceolate, obtuse to acute, almost entire, middle leaves with tapered base, panduriform, upper with broadly cordate base, acuminate, with scattered short hairs on both sides, all light green, reticulately veined beneath.

Inflorescence corymbose-paniculate, with 10–20 capitula; peduncles slender, without simple hairs but densely glandular, weakly tomentose. Involucres 7–9 mm long; involucre bracts without simple hairs but with dense, quite large glands, sparsely stellate-hairy. Stigmas dark. Achenes yellow or reddish-brown. Flowering July to August.

Scrubs and mountain meadows, to 2500 m.—*Caucasus*: Dagestan. *General distribution*: Central Europe, Mediterranean Region. Described from France (Aubagne). Type in Grenoble.

Note. In view of its geographic isolation, probably one should split off the Dagestan plant as a separate species. We were not able to examine specimens of it and the description is based on Zahn.

Subsection 4. Euprenanthoidea Juxip—Grex *H. prenanthoides* (Vill.) Zahn in Pflzr. IV, 280 (1921) 749.—Involucre bracts usually densely glandular. Characteristics are given in key and description of subsection.

Cycle 7. Lanceolata Juxip—Subgrex *H. lanceolatum* (Vill.) Zahn in Pflzr. IV, 280 (1921) 758.—Leaves broadly or narrowly lanceolate (3–6:1).

152. **H. reducatum** Norrl. em. Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 475.—*H. reducatum* Norrl. in Mela-Cajander, Suom. Kasvio, 739, pro ssp. *H. karelorum* Norrl.; Zahn in Pflzr. IV, 280 (1921) 761.—**Exs.**: Norrl. Hier. exs. fasc. VIII, No. 97.

Perennial. Stem about 40 cm high, reddish-violet and glabrous at base, from middle to inflorescence covered with scattered hairs 1.5 mm long, eglandular. Basal and 1–2 lower cauline leaves withering before anthesis; cauline leaves 10–20 (coefficient of leafiness 0.30), lanceolate, amplexicaul, panduriform, entire (3.5:1), up to 9 cm long, lower leaves scatteredly or moderately hairy on both sides, with short hairs 0.6–1 mm long, others glabrous above, densely or scatteredly hairy beneath along midrib and margin, light green above, glaucescent with reticulate venation beneath. Inflorescence paniculate, with few (3) capitula; peduncles sparsely short-hairy, with scattered glands 0.5 mm long, with scattered stellate pubescence. Involucres 8 mm long; involucre bracts acute, dark, without simple hairs or with occasional (6), hairs 1 mm long, and scattered, 46(40–50), glands 0.5–1.0 mm long, with scattered stellate pubescence. Stigmas dark. Flowering August.

138 Mountain slopes.—*European Part*: Karelia-Lapland. Endemic. Described from Chunutundra (Murmansk Region). Type in Helsinki; paratype in Leningrad.

Note. Norrlin considered this species as a variety of his *H. karelorum*.

153. **H. duderhofense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 476.

Perennial. Stem 40–80 cm high, 2–5 mm diameter, covered (mainly in upper half) with scattered hairs 1–1.5 mm long and above with occasional glands 0.3 mm long. Basal leaves withering before anthesis; cauline leaves 17(11–23) (coefficient of leafiness 0.27), lanceolate, panduriform, amplexicaul, entire, to 15 mm long (5:1), moderately hairy on both sides, hairs 0.7–1 mm long. Inflorescence openly paniculate, with 14(7–32) capitula, partly undeveloped; peduncles conspicuously covered with hairs 0.6–1 mm long, moderately or densely with glands 0.3 mm long, more or less tomentose. Involucres 9–10.5 mm long; involucre bracts obtuse, with occasional or few, 16(12–23), hairs 1 mm long and dense; 93(80–110), glands 0.2–0.5 mm long, and almost without stellate hairs. Stigmas dark. Flowering July to August.

Scrubs along shaded slopes, edges of spruce and mixed forests.—*European Part*: Ladoga-Ilmen. Endemic. Described from Leningrad Region (Dudergof). Type in Leningrad.

Note. In habit it resembles the form of *H. bupleurifolium* Tausch with entire leaves, differing by having conspicuous hairiness on the peduncles and involucre bracts but considerably weaker pubescence on the leaves.

Cycle 8. Strictissima Juxip—Subgrex *H. strictissimum* (Froel.) Zahn in Pflzr. IV, 280 (1921) 754.—Middle cauline leaves broad (3:1), with cordate amplexicaul base; lower leaves narrowed toward base to petiole.

154. **H. strictissimum** Froel. in DC. Prodr. VII (1838) 211; Zahn in Pflzr. IV, 280, 754; Zahn in Asch. and Graebn. Synopsis, XII, III, 287, non Dahlst., nec Peter, nec Simk.—*H. cydoniaefolium* Gris. ex Boiss. Fl. or. III (1875) 879, p. p.—*H. strictum* Fr. Symb. (1848) 164 and Epicr. (1862) 121 p. p.—**Exs.**: GRF No. 2082.

Perennial. Stem 30–100 cm high, 2–3 mm in diameter, at base violet, moderately pubescent with short hairs 1–1.5 mm long, often spinose. Basal and lowermost cauline leaves withering before anthesis; cauline leaves 10–30 (coefficient of leafiness 0.30–0.40), ovate-lanceolate, broad (2–2.5:1) or oblong-lanceolate, narrower (3–4.5:1 in var. *substrictissimum* Zahn), broadly amplexicaul, panduriform, acuminate, denticulate or
139 almost entire, moderately hairy on both sides with hairs 1.5 mm long, dark green above, glaucescent or reddish beneath with reticulate venation. Inflorescence openly paniculate, with 4–10 capitula; peduncles without simple hairs, but with scattered glands and tomentose. Involucres 9–12 mm long; involucre bracts obtuse, green-black, with

occasional (4–10) dark hairs 1 mm long, and with scattered, 38(30–45), glands 0.4–0.5 mm long, without stellate hairs. Ligule teeth weakly ciliate. Stigmas dark. Flowering July to August.

Herb places and scrubs in mountains.—*Caucasus*: Ciscaucasia, Eastern and Western Transcaucasia; *Soviet Central Asia*: Tien Shan (Alatau). *General distribution*: Central Europe, Atlantic Europe, Mediterranean Region, Balkans-Asia Minor, Iran, Indo-Himalayas. Described from Austria. Type in Geneva?

155. **H. imandrense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 476.

Stem 60–75 cm high, 2–3 mm in diameter, to two-thirds reddish, glabrous and only in upper third sparsely covered with short hairs 0.7 mm long, and occasional glands 0.3 mm long. Basal and lowermost 1–2 cauline leaves withering before anthesis; cauline leaves 17–20 (coefficient of leafiness 0.30), lanceolate, semiamplexicaul, more or less panduriform, entire, light green above, often violet beneath (4:1), to 11 cm long, lower leaf (of those persisting) with both sides densely (20) covered with short hairs 0.7–1 mm long, as a whole densely pubescent but the higher the leaves the less pubescent, upper leaves glabrous above. Inflorescence paniculate-umbellate with 8–27 capitula, partly undeveloped; peduncles with occasional, short hairs 0.6 mm long and with moderate number of glands 0.4 mm long, tomentose. Involucres 8.5–9.5 mm long; involucral bracts without (or with few, 0–2) simple hairs, with moderate number, 54(47–60), of glands 0.5 mm long, more or less conspicuously stellate-hairy. Stigmas yellow, later turning brown; florets saffron-yellow; ligule teeth more or less ciliate. Flowering August to September.

Grassy patches among stony screes above forest limits, in dwarf birch woodlands.—*European Part*: Karelia-Lapland. Endemic. Described from Khibini Mountains. Type in Kirovsk.

Note. It is distinguished from other closely related species by the yellow color of the stigmas and from the related species *H. reducatum* Norrl. also by the dense pubescence of the leaves.

156. **H. suberectum** Schischk. and Steinb. in Krylov, Fl. Zap. Sib, XI, (1949) 3056, em. Juxip.—*H. subelatum* Almqu. ex Dahlst. in Dahlst. Hier. Scand. V (1893) Nos. 96–98, non Zahn; Zahn in Pflzr. IV, 280, 756; in Asch. and Graebn. Synopsis, XII, III, 296; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 629.

Perennial. Stem 40–115 cm high, 2.5–5 mm in diameter, reddish-violet, more or less glabrous at base, covered above with sparse, short, white, remote hairs 1 mm long, and with occasional glands, and densely

stellate-hairy in upper part. Basal and lower cauline leaves withering before anthesis; cauline leaves 20(11–36) (coefficient of leafiness 0.30), lower leaves oblong-lanceolate, narrowed to broad petiole, somewhat panduriform, others sessile, ovate or ovate-lanceolate, with cordate, more or less semiamplexicaul base, acuminate, unequally and sharply serrate (with 3–10 teeth), with somewhat larger teeth intermingled, to 18 cm long (4.5:1), green, glaucescent beneath; leaves either scattered-hairy and then more or less glabrous above, scatteredly pubescent beneath along margin and densely so along midrib (f. *pilosius* Juxip) or moderately pubescent, upper leaves little hairy, without stellate hairs. Inflorescence corymbose-paniculate, with 13(3–34) capitula, partly undeveloped; peduncles without or with occasional hairs or covered with scattered hairs 2 mm long (f. *kuznetzovii* Juxip), glands 0.3–0.5 mm long, scattered or dense, scattered-tomentose. Involucres 8–10.5 mm long, cylindrical; involucre bracts obtuse, green-black, without or with occasional, 3(0–13), white hairs 1 mm long, but with dense, 83(54–118), yellow glands 0.3–0.5 mm long, stellate pubescence almost absent to quite dense, then making bracts gray. Florets golden-yellow, ligule teeth barely ciliate; stigmas dark. Achenes 3–4 mm long. Flowering July to August.

Mountain slopes at forest limit and in subalpine meadows, herb-birch forests, aspen and spruce forests, montane oak forests, thin forests and burned areas.—*European Part*: Dvina-Pechora, Volga-Kama (Urals); *Western Siberia*: Ob' Region. Endemic. Described from Urals. Type in Leningrad.

157. **H. albocostatum** Norrl. em. Juxip. in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 477; Norrl. in Mela-Cajander, Suom. Kasvio, 739; Zahn in Pflzr. IV, 280, 761, ex parte.—**Exs.**: Norrl. Hier. exs. fasc. VIII, No. 98.

Perennial. Stem about 55 cm high, 2.5 mm in diameter, moderately pubescent (particularly conspicuous in middle of stem) with hairs 1.5 mm long, with occasional glands above. Basal leaves withering before anthesis; cauline leaves 14 (coefficient of leafiness 0.25), lanceolate, lower somewhat panduriform, narrowed to broad petiole, middle and upper ones broad (2.5:1), lanceolate, amplexicaul, acuminate, very finely toothed, towards apex more or less entire, densely hairy on both sides, the higher the leaves the less pubescent, light green above, bluish-gray beneath. Inflorescence paniculate, with few (6) capitula; peduncles with occasional hairs 1.5 mm long and dense, glands 0.5 mm long, tomentose. Involucres 10.5 mm long; involucre bracts 1.2 mm broad, dark, more or less obtuse, with occasional to sparse (14) hairs 2 mm

141 long and dense (83), glands 0.5 mm long, with scattered stellate pubescence, apically comose. Stigmas dark. Flowering August.

Banks of lakes and streams.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region (Umbozero). Type in Helsinki; paratype in Leningrad.

158. **H. karelorum** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 739; sub *H. prenanthoides* Vill. **Karelorum* Norrl.; Zahn in Pflzr. VI, 280 (1921) 761 (nota).—**Exs.**: Norrl. Hier. exs. fasc. VIII, Nos. 99, 100.

Perennial. Stem 55–140 cm high, 2–4 mm in diameter, more or less glabrous (f. *glabrius* Norrl.) or moderately hairy (particularly in upper half) with hairs 1–2.5 mm long, somewhat glandular above. Basal leaves withering before anthesis; cauline leaves 19(12–25) (coefficient of leafiness 0.23), lanceolate, semiamplexicaul, lower panduriform, middle and upper ovate-lanceolate; all leaves entire, acuminate, to 21 cm long (4–7:1), very densely hairy, moderately (15) pubescent above, densely (25) beneath, with hairs 0.8–1 mm long, light green above, glaucescent beneath with reticulate venation. Inflorescence paniculate, with 13(5–28) capitula, partly undeveloped; peduncles glabrous (very rarely with occasional hairs) but with very dense glands 0.3 mm long, tomentose. Involucres 8.5–10.5 mm long; involucre bracts obtuse, blackish, with occasional, 4(0–8), hairs 1 mm long and dense, 87(56–126), glands 0.4 mm long mostly weakly but sometimes conspicuously stellate-hairy. Stigmas dark. Flowering July to August. (Plate XV, Fig. 1.)

Birch forests, scrubs and forest edges.—*European Part*: Karelia-Lapland, Ladoga Ilmen. *General distribution*: Scandinavia (Finland). Described from Karelia (Lake Ladoga). Type in Helsinki; paratype in Leningrad.

Cycle 9. Bupleurifolia Juxip—Subgex. *H. bupleurifolium* Zahn in Pflzr. IV, 280 (1921) 750.—Leaves distinctly panduriform, with cordate, amplexicaul base; densely or very densely glandular, with mostly large glands.

159. **H. hypoglaucum** Litw. and Zahn in Fedde, Repert. IV (1907) 242; Sched. HFR, VII, 34; Zahn in Pflzr. IV, 280, 754.—*H. prenanthoides* auct. fl. cauc.—**Exs.**: Zahn, Hier, Europ. No. 479; GRF No. 2083.

Perennial. Stems 80(20–140) cm high, 2–6 mm in diameter, erect, somewhat angular-sulcate, at base reddish, with scattered (denser in middle), light, thin hairs 1–2.5 mm long, with occasional fine glands below inflorescence, almost without stellate hairs. Basal leaves withering before anthesis (sometimes 1–2 lower cauline leaves also); cauline leaves 26(11–40) (coefficient of leafiness 0.33), lower oblong, tapered

- 142 to semiamplexicaul petiole, somewhat panduriform, to 17 cm long (4:1), others sessile, with broad, semiamplexicaul base, ovate-lanceolate, quite finely (spinously) toothed or less often conspicuously serrate, with alternating, more or less large and small teeth (f. *subdentatum* Zahn); all leaves olive-green above, grayish-blue beneath, glabrous or with sparse (4), hairs 1 mm long above, scattered hairs (12) 1 mm long beneath, densely (24) ciliate, along midrib beneath, scatteredly (12) so along margin. Inflorescence paniculate-umbellate, with 22(3–67) capitula, partly undeveloped; peduncles without (f. *epilosum* Zahn) or with occasional hairs 1 mm long (f. *pilosiusculum* Zahn) and with moderate or dense glands 0.4 mm long, grayish-tomentose. Involucres 8–10 mm long, cylindrical-ovate, with truncate base; involucre bracts more or less obtuse, blackish, with lighter border, without hairs (f. *epilosum* Zahn) or with occasional 6(2–9) hairs 1 mm long (f. *pilosiusculum* Zahn) and with moderate to dense, 78(46–120), glands 0.5(0.4–1) mm long, with stellate pubescence only at base and weak or at base and along margin to comose apex conspicuously hairy (var. *floccisquamum* Zahn). Ligule teeth ciliate. Stigmas dark. Flowering (June) July to August.

Scrubs and forest edges on mountain slopes, birch stands, subalpine forests, (500)1300–2600 m.—*Caucasus*: Ciscaucasia, Eastern, Western and Southern Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern Anatolia). Endemic. Described from Teberda. Type in Tbilisi; cotype in Leningrad.

160. **H. bupleurifolium** Tausch in Flora, XI (1828) Erg.-Bl. I, 74; Zahn in Pflzr. IV, 280, 751; Zahn in Asch. and Graebn. Synopsis, XII, III, 282.—*H. prenanthoides* var. *bupleurifolium* Wimm. and Grab. Fl. Siles, II, 2 (1827) 198.—*H. cydoniaefolium* Gris. Comment. (1852) 33 p. —*Exs.*: Fl. exs, Austro-Hang. No. 3387.

Perennial. Stem 30–70 cm high, 2–4 mm in diameter, at base reddish, to moderately covered (most densely in middle) covered with hairs 1–3 mm long, and above with occasional or sparse tiny glands and somewhat stellate-hairy. Basal leaves withering before anthesis; cauline leaves 17(9–27) (coefficient of leafiness 0.35), lanceolate, more or less amplexicaul, panduriform, lower narrowed, to 14 cm long, middle and upper sessile, ovate-lanceolate, acuminate (4:1), entire to unevenly finely serrate, densely hairy (densely on both sides, with 20 hairs), dark green, paler beneath, with reticulate venation. Inflorescence paniculate, with 9(4–27) capitula, partly undeveloped; peduncles without or with occasional hairs, moderately glandular with glands 0.3–0.5 mm long, tomentose. Involucres 8–10 mm long; involucre bracts obtuse, dark, with occasional, 6(2–10) short hairs 1 mm long and dense,

77(45–126), glands 0.2–0.5 mm long, yellowish, weakly stellate-hairy. Stigmas dark. Achenes yellowish. Flowering June to August.

- 143 Broad-leaved, oak-pine, beech and birch forests in mountains and subalpine meadows, 1600–2550 m, in “relict” forests (in Valdai Upland).—*European Part*: Ladoga-Ilmen, Upper Dniester; *Caucasus*: Ciscaucasia, Eastern, Western and Southern Transcaucasia. *General distribution*: Scandinavia(?), Central Europe, Mediterranean Region, Balkans-Asia Minor. Described from Sudeten. Type unknown.

161. **H. bupleurifolioides** Zahn, Hier. Schweiz (1906) 424; Zahn in Pflzr. IV, 280, 752; in Asch. and Graebn. Synopsis, XII, III, 284; Rchb. Ic. XIX, 2, 218, t.176b.—*H. lanceolatum* α . *multiglandulum* Zahn in Koch, Synopsis, 3, III, 1864.—*H. strictissimum* β . Simonk. Enum. Transsilv. (1886) 376.

Perennial. Stem 30–80 cm high, 1.5–5 mm in diameter, at base reddish-violet, moderately covered with hairs 1–2.5 mm long, with occasional to sparse glands above. Basal leaves withering before anthesis; cauline leaves 16(12–22) (coefficient of leafiness 0.33), lower narrowed to petiole, to 12 cm long, others broad (3:1), ovate-lanceolate, amplexicaul, panduriform, mostly finely toothed (or mixed with larger teeth), acuminate, green above, paler beneath, with reticulate venation, on both sides moderately (12–14) pubescent with short hairs 0.5–1.5 mm long. Inflorescence openly paniculate, with 16(7–37) capitula; peduncles almost glabrous but densely glandular with glands 0.3–0.5 mm long, tomentose. Involucres 8–10 mm long; involucre bracts obtuse, dark, with occasional, 6(3–9), hairs 1 mm long and dense, 104(86–133), glands 0.4–1 mm long, weakly stellate-hairy. Stigmas more or less dark; ligule teeth ciliate. Achenes yellow (pale) brown. Flowering July to August.

Montane forests, birch stands, subalpine and alpine meadows, from 1300 to 2200 m.—*European Part*: Upper Dniester; *Caucasus*: Ciscaucasia, Dagestan, Eastern Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Switzerland. Type unknown.

162. **H. meinshausenianum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 477.

Perennial. Stem 80–100 cm high, 3–4 mm in diameter, sulcate, at base reddish-violet, glabrous, scatteredly pubescent from middle with hairs 1–1.5 mm long, sparsely glandular above. Basal leaves withering before anthesis; cauline leaves 20–26 (coefficient of leafiness 0.25), lower elongated, lanceolate, panduriform, to 17 cm long (3.8:1), others sessile, ovate-lanceolate, amplexicaul, entire, acuminate, on both sides

covered with moderate, short (0.5–1 mm long) hairs. Inflorescence paniculate-umbellate, with 4–16 capitula; peduncles with occasional hairs 0.5–1 mm long, moderately (to very densely) glandular with glands 0.3–0.4 mm long, scattered-tomentose. Involucres 9.5–10 mm long; involucre bracts obtuse, to sparsely (conspicuously), 17(14–20), short-pubescent (1 mm long), densely, 110(95–125) glandular with glands 0.5 mm long, without stellate hairs. Stigmas dark. Flowering July to August.

Forest edges along lake shores (Lakes Ladoga and Chudskoe).—*European Part*: Ladoga-Ilmen. Endemic. Described from shores of Lake Ladoga (Ostermanov Landing). Type in Leningrad.

Note. It is distinguished from the closely related *H. bupleurifolioides* Zahn by conspicuously pubescent involucre bracts and from other closely related species by moderately glandular peduncles with occasional hairs.

163. **H. multiglandulosum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 478.—*H. lanceolatum* α . *multiglandulosum* Zahn f. *brevipilum* in sched. ad Herb. Fl. Ross. V (1905) sub No. 1288.—*H. bupleurifolioides* Zahn in Pflzr. IV, 280, 752, ex parte.—**Exs.**: GRF No. XXVI, No. 1288.

Perennial. Stem 60–130 cm high, 3–6 mm in diameter, sulcate, at base reddish, more or less glabrous or very sparsely pubescent with hairs 1 mm long, 0.2–0.3 mm long above, with occasional or scattered glands. Basal and lowermost cauline leaves withering before anthesis; cauline leaves 20(11–27) (coefficient of leafiness 0.24), lanceolate, panduriform, lower narrowed to expanded base, to 17 cm long (5:1), middle and upper sessile, with broad, cordate, semiamplexicaul base, entire, sparsely (7) pubescent above, scatteredly or moderately (12) beneath with hairs 0.8–1 mm long. Inflorescence paniculate-umbellate with 17(5–40)(–60) capitula; peduncles mostly without, sometimes with occasional simple hairs and dense glands 0.3 mm long, scatteredly to tomentosely, stellate-hairy. Involucres 8.5–10.5 mm long; involucre bracts subobtuse, with or without occasional (0–11) short hairs 0.5 mm long and dense, 100(55–145), glands 0.4–1.0 mm long, with or without scattered stellate hairs. Stigmas dark. Flowering July to August. (Plate XIV, Fig. 1.)

Scrubs along shores of lakes and streams, in alders and spruce, or spruce-broad-leaved (relict) forests.—*European Part*: Baltic Region (eastern part of the Estonian SSR), Ladoga-Ilmen, Upper Volga. Endemic(?). Described from Kresttsy District in former Novgorod Region. Type in Leningrad.

Note. *H. bupleurifolioides* Zahn, to which our species is referred by Zahn, is distinguished first of all by the toothed leaves (l. c.) and range extending from Central Europe through the Balkans-Asia Minor region to Transcaucasia. Thus, besides morphological distinctiveness, our species is geographically isolated as well.

164. **H. kovdaense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 478.

145 Perennial. Stem 50–60 cm high, 2–3 mm in diameter, at base violet, more or less glabrous, with sparse, large glands (1 mm long) above. Basal leaves sometimes persisting at anthesis (0–3); cauline leaves 6 (coefficient of leafiness 0.10), lanceolate, narrowed to amplexicaul petiole, to 11 cm long (4.5:1), almost entire, moderately pubescent. Inflorescence paniculate, with 15(7–22) capitula; peduncles glabrous but densely glandular with glands 0.3–1 mm long, weakly stellate-hairy. Involucres 9.5 mm long; involucral bracts glabrous but with dense, 115(110–120), small and large glands (0.3–1 mm long), without stellate hairs. Stigmas dark. Flowering July to August.

Herb-birch forests.—*European Part:* Karelia-Lapland. Endemic. Described from Kandalaksha. Type in Kirovsk.

Note. Notable for its low coefficient of leafiness indicating the transitional nature of this species to section *Vulgata*.

165. **H. buschianum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 479.

Perennial. Stem 45 cm high, 3 mm in diameter, at base violet, especially densely hairy, hairs 2 mm long. Basal as well as 1–2 lower cauline leaves withering before anthesis; cauline leaves 17 (coefficient of leafiness 0.40), lower oblong-lanceolate, panduriform, narrowed to broad petiole, others ovate-lanceolate (3.5:1), sessile, with broadly cordate, amplexicaul base, entire or with 4–5 small teeth at base, acuminate, with both sides densely covered (20) with hairs 1 mm long, glabrescent beneath. Inflorescence paniculate-umbellate with 9 capitula; peduncles very densely covered at base with dark and light fine hairs 2 mm long, moderately glandular (glands 0.5 mm long) and scatteredly stellate-hairy. Involucres 11 mm long; involucral bracts obtuse, scattered-pubescent, 33(26–38), with light hairs 2–2.5 mm long, very densely, 163(148–173), glandular with glands 0.2 to 1 mm long, without stellate hairs. Stigmas dark; ligule teeth ciliate. Flowering August. (Plate XVII, Fig. 1.)

Subalpine meadows.—*Caucasus:* Eastern Transcaucasia. Endemic. Described from southern Ossetia (Middle Ermansk Ravine). Type in Leningrad.

Note. It draws attention because of having, for this section, unusually dense pubescence on all parts and exceptionally dense glands.

166. **H. loriense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 479.

Perennial. Stem 60–70 cm high, sturdy, 4 mm in diameter, reddish-brown and quite densely pubescent almost entire length, particularly in upper half, with hairs to 3 mm long, with occasional glands above.

- 146 Basal leaves withering before anthesis, cauline leaves 22 (coefficient of leafiness 0.34), broadly lanceolate (2.5:1), sessile, with broad, cordate, amplexicaul base, short-acuminate, denticulate, light green above, bluish beneath, with both sides moderately pubescent with hairs 1–1.5 mm long (along margin 2.5 mm). Inflorescence corymbose-paniculate, with 10 capitula; peduncles without or with occasional hairs to 2.5 mm long, but with very dense glands 1 mm long, with scattered stellate pubescence. Involucres 9 mm long; involucral bracts dark, more or less obtuse, with conspicuous, 22(20–26), hairs 2.5 mm long and dense, 115(90–140), glands at base large (1 mm long) and with small ones (0.2 mm long) in between, without stellate hairs. Stigmas dark; ligule teeth ciliate. Flowering July to August. (Plate XVIII, Fig. 11.)

Subalpine meadows at 2200–2400 m.—*Caucasus*: Southern Transcaucasia. Endemic. Described from Armenia. Type in Leningrad.

Note. It is distinguished from the closely related *H. bupleurifolioides* Zahn by the conspicuous hairs of the involucral bracts and very dense glands on the peduncles.

167. **H. brittatense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 480.

Perennial. Stem 40–50 cm high, 3.5 mm in diameter, sulcate, at base violet, scatteredly pubescent with hairs to 2.5 mm long (more conspicuous in upper half), eglandular. Basal and lower cauline leaves withering before anthesis; cauline leaves 19(16–22) (coefficient of leafiness 0.40), broadly lanceolate (2.6:1), with cordate, amplexicaul base, acuminate, slightly toothed, glaucescent beneath with reticulate venation, glabrous above, with occasional short hairs (0.6 mm long) beneath. Inflorescence openly corymbose-paniculate, branched (branching from middle), with 21–(14–28) capitula, partly undeveloped; peduncles glabrous but densely glandular, glands 0.5 mm, with scattered stellate pubescence. Involucres 9 mm long; involucral bracts dark, obtuse, with occasional (4), hairs 1 mm long and very dense, (168), glands 0.5–0.2 mm long; weakly stellate-hairy. Stigmas dull green; ligule teeth weakly ciliate. Flowering August. (Plate XIX, Fig. 1.)

Meadows near montane birch forests, at 2300 m.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Southern Ossetia (Brittatsk Ravine). Type in Leningrad.

Note. It differs from the closely related species *H. bupleurifolioides* Zahn by having very dense glands on the involucre bracts and densely glandular peduncles.

168. ***H. perfoliatum*** Froel. in DC. Prodr. VII (1838) 211, non Huter.: Fr. Epicr. 120; Zahn, Hier. Schweiz. 421; Zahn in Pflzr. IV, 280, 750; 147 Zahn in Asch. and Graebn. Synopsis, XII, III, 281.—*H. prenanthoides* var. *latifolium* Taush. in Flora, XI (1828) Erg.-Bl. I, 74, p. p.—? *H. amplexicaule* M.B. Fl. taur.-cauc. II (1808) 254.—*H. glandulosissimum* Peter, Beitr., Hier. Osteur. Orient. (1893) 32, nec. Dahlst.—*H. subglandulosissimum* Zahn in Pflzr. IV, 280 (1923) 753.—**Exs.**: GRF No. 2084.

Perennial. Stem 30–80(–90) cm high, 2–5 mm in diameter, angular-sulcate, scatteredly or very densely pubescent with hairs 1–2 mm long, scatteredly glandular above. Basal leaves none at anthesis; cauline leaves 19(11–26) (coefficient of leafiness 0.35), broadly lanceolate (4:1), lower ovate-oblong, petiolate, to 13 cm long, others sessile, ovate-lanceolate, panduriform, acuminate, with broad amplexicaul base, almost entire (or finely and unevenly 5–7 toothed, var. *subdentatum* Zahn), light green above, bluish-gray beneath, on both sides densely short-hairy (hairs 1 mm long), sometimes more or less glabrous above (var. *latifolium* Zahn). Inflorescence paniculate, with 17(6–36) capitula, partly undeveloped; peduncles more or less without simple hairs, but very densely glandular (glands 0.5 mm long), tomentose. Involucres 8.5–9.5 mm long; involucre bracts dark, obtuse, without hairs or with occasional, 6(2–10), hairs 1 mm long (subvar. *pilisquamum* Zahn) and densely, 106(94–143), glandular with large glands (0.5–1 mm long), sparsely stellate-hairy. Stigmas dark. Flowering July to August.

Mountain slopes from limit of fir forest, forest glades and subalpine meadows, at 2300–2800 m.—*Caucasus*: Eastern and Western Transcaucasia. *General distribution*: Central Europe, Mediterranean Region, Balkans-Asia Minor. Described from Switzerland. Type in Geneva.

Section 10. Alpina Fr. Epicr. (1862) 42; Peter in Pflanzenfam. IV, 5, 383; Zahn in Pflzr. IV, 280, 621; in Asch. and Graebn. Synopsis, XII, III, 137.—The characters are in the key. The members of this section have two separate distribution areas in our country: 1) the arctic-subarctic area, extending eastward to the Yamal Peninsula, inclusively, and an arm to the south along the Urals; and 2) in the eastern Carpathians (in the alpine and subalpine belts).

Among the sections, *Alpina* more or less stands apart, having links only to sections *Vulgata* and *Prenanthoides*; its species grow together with members of these sections.

According to Zahn (see the distribution map of *H. alpinum*, Zahn in Pflzr. l. c.), the limit of the distribution of *Alpina* in Siberia supposedly reaches as far as Chukotka. However, among the extremely abundant material in the Herbarium of the Botanical Institute, Academy of Sciences of the USSR, we were unable to locate a single specimen east of 72° E. Long.

Moreover, Zahn (Asch. and Graebn. Synopsis (1936) 156) reported the occurrence of *H. alpinum* in the Baltic Region: "...in Livland... sporadisch." The report that this species grows on Saaremaa Island
148 (Oesel; dr. Luce) has not been confirmed subsequently.

Note. The extensive material on section *Alpina* collected by R. Pohle from the north of our country during the period 1899–1911 was identified by Zahn in his own time, who mainly upheld the species established by I. Norrlin (on the basis of Scandinavian and partly Kola material).

Following them, this material caught the attention of M. Elfstrand, who had to reidentify a majority of the plants, as he himself mentioned in the introduction to his work "Hieracia alpina aus Nord Russland u. dem Uralgebirge" [Sv. Bot. Tidskr. VIII, 2 (1914) 201]. As an example, we point out that under *H. flexicaule* Elfstr. he included the plants identified by Zahn as *H. gracillimum* Elfstr., *H. fuliginosum* Laest., *H. petiolatum* Elfstr., and *H. subaquiloneum* Norrl., and under *H. senescentifrons* Elfstr.—*H. atratum* Norrl., *H. decurrens* Norrl., *H. semicurvescens* Norrl., and *H. colpodes* Norrl.

While treating the material for *Flora SSSR* [Flora of the USSR], it became clear that Elfstrand was extraordinarily attentive to his task, and his identifications rarely invite criticisms. Therefore, in the present work, we have stayed with his identifications and have disregarded the identifications of Zahn, who subdivided identical plants without any basis under different names, and, on the contrary, different plants were combined under one name.

At the same time, however there is no doubt that many of Elfstrand's species are synonyms of species established earlier by Norrlin. In order to make the highly inadequate diagnoses of Norrlin (unfortunately too laconic) more precise, one ought to analyze all the authentic Norrlin specimens preserved in Helsinki and Stockholm, which would have stretched out our work for a long time. In this context, it is essential to mention here that Norrlin himself identified the plants extraordinarily accurately.



1. Stigmas yellow. Involucres large, 15(12–20) mm long; outer involucre bracts in part exceeding others, lax, leafy; hairs light, with very short dark base. Lamina of leaves gradually narrowed to petiole. Stem short, 10–20 cm high, almost always uncapitulate. Subsection 1. *Alpina vera* Juxip.....2.
- + Stigmas mostly dark to black (if, as an exception, yellow or yellowish-brown, then other characters different). Involucres smaller (8–16 mm long); all involucre bracts tightly appressed; hairs with short light cusp and conspicuous dark base. Lamina of leaves abruptly narrowed to petiole, rarely gradually. Stem 10–50 cm high; inflorescence with (1)–2–10(–15) capitula (if uncapitulate, then usually with apparent rudiment of another capitulum).....8.
- 151 2. Plants dark- or dull-green (living plants); stigmas always yellow 3.
- + Plants light green; stigmas yellowish-brown, later turning dark; leaves always densely recurved-toothed; involucres large, 18–20 mm long.....175. **H. apiculatum** Tausch.
3. Involucres ovate or hemispheric, longer than broad.....4.
- + Involucres truncate, broader than long.....7.
4. Leaves entire or with few short teeth.....5.
- + Leaves sinuate-toothed.....6.
5. Plants (stem, leaves, and inflorescence) densely pubescent; involucres large, 14(12–18) mm long.....169. **H. alpinum** L.
- + Plants (stem and leaves) very sparsely hairy, involucre bracts moderately so; involucres shorter, 11(9–14) mm long (Carpathians)170. **H. gymnogenum** Zahn
6. Involucres 14–17 mm long; florets yellow; leaves crisped-hairy, pubescence of leaves mostly moderate or dense (conspicuous)171. **H. crispum** Elfstr.
- + Involucres 11–14 mm long; florets orange-yellow; leaf margin not crisped-hairy; pubescence of leaves and stem quite sparse (at first glance glabrous).....172. **H. vitellicolor** Elfstr.
- 7 (3). Coefficient of leafiness 0.10, i.e., cauline leaves 1–3; stem scapose, uncapitulate; stem and leaves scatteredly hairy.....173. **H. melanocephalum** Tausch.
- + Coefficient of leafiness 0.23, i.e., cauline leaves 2–5; stem branched, with single capitulum at apex of branches; branches very small-leaved; stem and leaves densely pubescent.....174. **H. folioliferum** Elfstr.
- 8 (1). Capitula 1–2 (rarely to 3–4); leaves usually of *H. alpinum* type, i.e. with lamina more or less gradually narrowed to petiole (subsection 2. *Nigrescentia* Juxip).....9.

- + Capitula 4–6(–15); leaves usually as in members of section *Vulgata*, i.e., lamina clearly separated from petiole, base of lamina more or less abruptly narrowed to petiole, either truncate or cordate (rarely of another shape); inflorescence openly paniculate (less often dichotomous).....50.
9. Capitula usually 1 (rarely 2–3).....10.
- + Capitula of average number (1–4).....30.
10. Coefficient of leafiness average (0.07–0.13).....11.
- + Coefficient of leafiness high or very high (0.14–0.25).....23.
- 152 11. Hairs on involucre bracts very dense or dense.....12.
- + Hairs on involucre bracts moderate or scattered.....20.
12. Hairs on involucre bracts very dense 130(80–180).....13.
- + Hairs on involucre bracts dense, 80(60–150).....15.
13. Leaves with small teeth (Malozemelskaya and Bolshezemelskaya tundra and Urals).....176. *H. iremelense* Juxip
- + All leaves with 3–5 prominent triangular teeth.....14.
14. Stigmas yellow.....177. *H. omangii* Elfstr.
- + Stigmas dark.....177. *H. omangii* var. *leptopholis* Elfstr.
15. Glands on involucre bracts very dense, 120(60–160).....16.
- + Glands on involucre bracts moderate or sparse.....17.
16. Teeth of ligules ciliate.....178. *H. comosum* Elfstr.
- + Teeth of ligules eciliate.....179. *H. glabriligulatum* Norrl.
17. Glands on involucre bracts moderate (60–80) or more or less dense; stigmas dark.....19.
- + Glands on involucre bracts scattered (30) or sparse.....18.
18. Stigmas yellow or yellowish-brown.....180. *H. adspersum* Norrl.
- + Stigmas black.....182. *H. akjaurens* Norrl.
19. Plants of Murmansk Region.....
-180. *H. adspersum* var. *gawrilowae* Elfstr.
- + Plants of Carpathians.....181. *H. decipiens* Tausch.
- 20 (11). Glands on involucre bracts very dense, 130(90–180).....21.
- + Glands on involucre bracts moderate.....22.
21. Stigmas dark.....183. *H. petiolatum* Elfstr.
- + Stigmas yellow.....184. *H. flexicaule* Elfstr.
22. Glands on involucre bracts moderate; florets tubular; stigmas dark; involucre 10(8–12) mm long.....185. *H. naniceps* Elfstr.
- + Glands on involucre bracts scattered; florets ligulate; stigmas yellow or yellowish-brown; involucre 12–16 mm long.....
-180. *H. adspersum* Norrl.
- 23 (10). Coefficient of leafiness high (0.14–0.20).....24.
- + Coefficient of leafiness very high (0.25); leaves narrowly lanceolate.....29.
24. Hairs on involucre bracts dense (60–100).....25.

- + Hairs on involucre bracts few.....27.
 153 25. Glands on involucre bracts dense (60–100).....26.
 + Glands on involucre bracts sparse; florets tubular; leaves coarsely
 toothed; stem mostly violet.....188. **H. coloratum** Elfstr.
 26. Leaves with scattered pubescence, mostly entire; involucre 13–
 16 mm long (or 12 mm long—var. *wologdense* Elfstr.); outer in-
 volucre bracts remote.....186. **H. frondiferum** Elfstr.
 + Leaves densely pubescent (unusual for members of the section);
 more or less distinctly serrate; involucre 12 mm long; involucre
 bracts tightly appressed.....187. **H. modiciforme** Juxip
 27. Hairs on involucre bracts moderate (30–50).....28.
 + Hairs as well as glands on involucre bracts sparse (–20); florets
 ligulate; leaves from base to middle with occasional teeth, to apex
 entire.....191. **H. pseudophyllodes** Zahn
 28. Glands on involucre bracts very dense (100); stigmas yellowish-
 brown.....189. **H. iapinense** Juxip
 + Glands on involucre bracts moderate (50); stigmas dark.....
190. **H. pyrsjuense** Juxip
 29 (23). Stigmas dark; hairs on involucre bracts very dense, glands mod-
 erate; stem densely pubescent.....192. **H. uralense** Elfstr.
 + Stigmas yellowish-brown; hairs as well as glands on involucre
 bracts dense; stem with scattered pubescence.....
193. **H. excubitum** Elfstr.
 30 (9). Coefficient of leafiness 0.03–0.13.....31.
 + Coefficient of leafiness high (0.14–0.20).....47.
 31. Coefficient of leafiness low (0.03–0.06).....32.
 + Coefficient of leafiness average (0.07–0.13).....40.
 32. Hairs on involucre bracts moderate or dense.....33.
 + Hairs on involucre bracts sparse (–20), with very dense glands
 (to 1 mm long).....202. **H. senescentifrons** Elfstr.
 33. Hairs on involucre bracts dense (60–100); involucre 11–13 mm
 long.....34.
 + Hairs on involucre bracts moderate (30–50).....36.
 34. Glands on involucre bracts dense.....35.
 + Glands on involucre bracts moderate (45–65); stem more or less
 glabrous, as also peduncles (latter with dense glands 0.5 mm
 long); cauline leaves conspicuously glandular.....
196. **H. monczecola** Juxip
 35. Stigmas dark; leaves denticulate; densely pubescent.....
194. **H. bimanum** Norrl.
 154 + Stigmas yellow; leaves coarsely toothed to pinnately lobed, with
 scattered pubescence.....195. **H. subincomptum** Zahn

- 36 (33). Glands on involucre bracts very dense (90–150) two times as many as hairs; involucre large, 13–16 mm long; leaves broad, 4:1.....197. **H. boreum** Elfstr.
 + Glands on involucre bracts moderate or dense.....37.
37. Glands on involucre bracts dense (80–115); leaves coarsely toothed.....38.
 + Glands on involucre bracts scattered to moderate (35–75); involucre medium.....39.
38. Stigmas yellowish-brown; involucre 13.5 mm long.....199. **H. pergrandidens** Zahn
 + Stigmas dark; involucre 11.5 mm long; peduncles with occasional hairs.....198. **H. subimandrae** Juxip
39. Stigmas yellowish-brown; leaves denticulate, toward apex entire, densely hairy (unusual for members of the section).....201. **H. pseudobipes** Elfstr.
 + Stigmas dark; leaves almost entire, with scattered hairs; peduncles distinctly pubescent.....200. **H. kuroksarensae** Juxip
- 40 (31). Hairs on involucre bracts dense.....41
 + Hairs on involucre bracts moderate; florets at least partly tubular.....45.
41. Glands on involucre bracts very dense (100–130).....42
 + Glands on involucre bracts moderate or dense (50–80).....43.
42. Leaves with 2–3 large teeth (to 5 mm long), with scattered pubescence, narrower (6.5:1) (Kola Peninsula).....203. **H. lujaurensae** Norrl.
 + Leaves in lower half with 4–5 small teeth, in upper half entire, moderately pubescent (Northern Urals).....204. **H. soczavae** Juxip
43. Leaves densely pubescent (unusual for members of the section); involucre small (10 mm long).....205. **H. vaidae** Juxip
 + Leaves barely to moderately pubescent (typical for the section); involucre larger.....44.
44. Stigmas dark; leaves stellate-pubescent beneath (Kola Peninsula).....206. **H. decurrens** Norrl.
 + Stigmas yellowish-brown (Arctic Urals).....207. **H. stenopiforme** Pohle and Zahn
- 45 (40). Glands on involucre bracts very dense (85–115).....46.
 155 + Glands on involucre bracts moderate; stigmas blackish; peduncles conspicuously pubescent.....209. **H. tanense** Elfstr.
46. Involucre 14–16 mm long (stigmas dark, less often yellow).....208. **H. stenomischum** Omang.
 + Involucre 11–12 mm long.....208. **H. stenomischum** Om. var. **vultum** Elfstr.

- 47 (30). Hairs on involucre bracts very dense (150); glands to moderate (50); leaves densely pubescent (unusual for members of the section).....210. **H. fuliginosum** Laest.
 + Hairs on involucre bracts moderate or dense.....48.
48. Hairs on involucre bracts dense (70–125), glands to dense (50–95); pubescence of bracts sparse; leaves entire or serrulate (var. *serratodenticulatum* Juxip), uppermost leaves clustered below inflorescence, hence capitula look pappose.....211. **H. gorodkowanum** Juxip
 + Hairs on involucre bracts moderate (to dense) (40–80); florets partly tubular.....49.
49. Glands on involucre bracts very dense (95–150), two times as many as hairs; involucre large, 11–14 mm long.....212. **H. polymorphophyllum** Elfstr.
 + Glands on involucre bracts to moderate (35–60); involucre shorter, 9(–12) mm long.....213. **H. finmarkicum** Elfstr.
- 50 (8). Inflorescence with 4((1–)2–12) capitula, strongly dichotomous to openly paniculate; cauline leaves 1–2(–3) (subsection 3. *Atrata* Juxip).....51.
 + Inflorescence with 6(1–15) capitula, openly paniculate; cauline leaves 3–4(–8) (Carpathians) (subsection 4. *Alpivulga* Juxip).....64.
51. Coefficient of leafiness low (0.03–0.06).....52.
 + Coefficient of leafiness average to very high (0.07–0.25).....61.
52. Hairs on involucre bracts moderate to dense.....53.
 + Hairs on involucre bracts sparse to absent.....57.
53. Hairs on involucre bracts dense.....54.
 + Hairs on involucre bracts moderate to scattered.....55.
54. Glands on involucre bracts dense; involucre large, 12–16 mm long; florets sometimes partly tubular.....214. **H. ovaliceps** Norrl.
 + Glands on involucre bracts scattered to moderate (35–55); involucre shorter (10–)11–13 mm long; florets ligulate.....215. **H. barbulatum** Pohle and Zahn
55. Glands on involucre bracts very dense (110–180) (Carpathians).....56.
 + Glands on involucre bracts dense (50–100), two times as many as hairs; involucre of average size (10–12 mm long) (Lapland).....218. **H. semicurvatum** Norrl.
56. Involucre 12–16 mm long; glands on involucre bracts four times as many as hairs; leaves with scattered pubescence.....216. **H. nigrescens** Willd.
 + Involucre 10–13 mm long; glands on involucre bracts five times as many as hairs; leaves densely (unusual for the section) pubescent, broad (3:1).....217. **H. atrellum** Zahn

- 57 (52). Hairs on involuclral bracts sparse or occasional.....58.
 + Hairs on involuclral bracts entirely absent, glands to dense.....60
58. Glands on involuclral bracts very dense (75–160); involuclres of average size, 10–11.5 mm long; stigmas yellowish-brown (Kola Peninsula).....219. **H. scotaiolepis** Elfstr.
 + Glands on involuclral bracts very dense.....59.
59. Stigmas black; florets partly tubular; involuclres large, 13–15 mm long (or shorter—10–13 mm long—f. *minoriceps* Zahn); leaves densely pubescent (Carpathians).....220. **H. subnigrescens** Fr.
 + Stigmas yellowish brown; florets ligulate; involuclres 12–14 mm long; leaves sparsely pubescent (Kola Peninsula).....
221. **H. orthopodum** Dahlst.
- 60 (57). Stigmas yellowish-brown; involuclres large, 12–14 mm long; leaves alternately coarsely and finely toothed (Kola Peninsula).....
221. **H. orthopodum** Dahlst.
 + Stigmas dark; involuclres smaller, 10–11 mm long; leaves more or less entire (Arctic Urals).....222. **H. ussense** Pohle and Zahn
- 61 (51). Coefficient of leafiness medium (0.07–0.13).....62.
 + Coefficient of leafiness high (0.26), i.e., cauline leaves 5–9, narrowly lanceolate (10.5:1); involuclral bracts very densely (85–115) pubescent, with scattered glands (hairs two times as many as glands); involuclres large, 14.5 mm long (arctic zone of Western Siberia).....226. **H. manifestum** Juxip
62. Involuclral bracts glabrous (Kola Peninsula).....63.
 + Involuclral bracts very densely pubescent and with occasional glands; involuclres large, 13–15 mm long (Northern Urals).....
225. **H. eximiiforme** Dahlst.
63. Stigmas dark; involuclres medium, 11 mm long; leaves densely pubescent (unusual for the section).....223. **H. voroniense** Juxip
- 157 + Stigmas yellowish-brown; involuclres short, 8–9 mm long.....
224. **H. murmanicola** Zahn.
- 64 (50). Coefficient of leafiness low to medium (0.03–0.13).....65.
 + Coefficient of leafiness very high (to 0.20); hairs as well as glands on involuclral bracts dense; florets often tubular; involuclres large, 12–15 mm long; leaves to densely pubescent.....
230. **H. fritzei** F. Schultz
65. Coefficient of leafiness low (0.05), i.e., cauline leaves 0–2(–3); involuclral bracts with moderate number of hairs and glands, densely (along margin) stellate-pubescent; involuclres 11–13 mm long.....
227. **H. rohacsense** Kit.
 + Coefficient of leafiness 0.11–0.13, i.e., cauline leaves 1–5; involuclral bracts sparsely (to moderately) pubescent, almost without stellate hairs.....66.

66. Glands on involucre bracts very dense; stigmas dark, leaves also stem densely pubescent; involucre 10–12.5 mm long; florets often tubular.....228. **H. lomnicense** Wol.
 + Glands on involucre bracts to dense; stigmas yellow (to dark); leaves moderately pubescent; involucre 8–11(–13) mm long; florets ligulate.....229. **H. krasanii** Wol.

Subsection 1. Alpina vera (Elfstr.) Juxip.—Elfstr. Hier. Alp. (1893); Norrl. in Mela-Cajander, Suom. Kasvio, 676.—*H. eualpina* Dahlst. in Lindm. Svensk. Fan.-Fl. 2, ed. (1926) 598.—*Grex H. alpinum* (L.) Zahn in Pflzr. IV, 280 (1921) 623.—*H. linnaei* Zahn and *H. apiculatum* (Tausch.) Zahn in Asch. and Graebn. Synopsis, XII, III (1936) 139.—Stem usually short, few-leaved, with one or few capitula; involucre usually large, with more or less free, divergent outer bracts; basal leaves generally lobed, with tiny glands (particularly along margin) as also on stem and involucre bracts; achenes large, reddish-brown to black.

Cycle 1. Alpina Juxip.—*Grex H. linnaei* Zahn in Asch. and Graebn. Synopsis, XII, III (1936) 139.—Stigmas yellow in living as well as dried condition; plants dark or dull green.

169. **H. alpinum** L. Sp. pl. (1753) 800; Froel. in DC. Prodr. VII, 208; Fr. Symb. 69; Ldb. Fl. Ross. II, 852; Norrl. in Mela-Cajander, Suom. Kasvio, 677; Zahn and Flerov, Fl. Evrop. Ross. 1100; Zahn in Pflzr. IV, 280, 621; Dahlst. in Lindem. Svensk. Fan.-Fl., 2 ed. 600.—*H. eu-alpinum* Zahn in Asch. and Graebn. Synopsis, XII, III (1936) 137; Krylov, Fl. Zap. Sib. XI, 3053; Samuelsson, Maps of Scand. Hier. sp. No. 15.—**lc.**: Rchb. Ic. XIX, 2, t.150.—**Exs.**: Norrl. Hier. exs. fasc. VII, Nos. 10–16, IX, No. 20.

- 158 Perennial. Stem (5–)10–20(–30) cm tall, 1–2.5 mm in diameter, erect or ascending; often several stems, pilose, usually densely pubescent with light-colored hairs 3–8 mm long, with black base, moderately glandular throughout (more densely above); stellate-hairy above, sometimes tomentose. Basal leaves 7(3–12), outer mostly small, rounded, obovate, elliptical to oblong (at anthesis often partly withering), inner short to quite long (to 15 cm), gradually narrowed to more or less broadly winged petiole, obovate, lanceolate-spatulate, undulate with plicate tip, entire or slightly denticulate, light or dull (dark) green, sometimes violet (herbarium specimens often yellow-green), on both sides sparsely or moderately pubescent with hairs 1.5–3 mm long, without stellate hairs but with scattered, tiny glands along margin and on midrib beneath; cauline leaves 2(0–4) (average coefficient of leafiness 0.13), lanceolate to linear, gradually reduced, immediately

below capitulum grading into involucre bracts, sometimes stellate-hairy along lower part of midrib and margin. Inflorescence unicapitulate (rarely 2–3 capitula); involucre large, 14(12–16) mm long, ovate to hemispherical, with rounded or truncate base, involucre bracts more or less obtuse or acute, almost black (outer bracts greenish, loosely divergent, foliaceous), quite densely pubescent (on an average) with 130(60–250), gray or dark hairs 2–5 mm long (often concealing involucre bracts; hairs on old herbarium specimens chestnut-tinged), glands also quite dense, 130(65–160), usually very small (0.1 mm long or shorter), sometimes at base mixed with larger (0.3–0.5 mm long) glands, visible under high magnification ($\times 30$) and in incident light, stellate hairs completely absent. Florets light yellow, sometimes partly or entirely tubular (var. *cleistogamum* Dahlst.); corolla teeth ciliate; stigmas yellow. Achenes 3–4 mm long, blackish-brown. Flowering July to August. (Plate XX, Fig. 1.)

Dry alpine meadows, on turf slopes among rocks and stones, at limit of birch forests, meadow tundra on sandy soil, on stony scree, shrub-lichen and dwarf birch tundra, headlands, sandy ridges and gravel beds, often abundant. In mountains from 800 to 2600 m. Prefers sandy soil but also grows on clayey calcareous soils.—*Arctic*: Arctic Europe and Arctic Siberia; *European Part*: Karelia-Lapland, Dvina-Pechora, Volga-Kama (Urals to 60° N. lat., south of it sporadically, as a relict plant in Iremel and Yamantau mountains); upper Dniester (Carpathians: Pope Ivan, Goverla, Petros). *General distribution*: Arctic, Scandinavia, Central Europe (from Alps to Carpathians inclusive), Atlantic Europe (Scotland), North America (Greenland). Absent in Pyrenees, Apennines and Balkans and also in Caucasus. Described from Sweden. Type in London.

159 **Note.** It is a highly polymorphic species varying particularly in pubescence and shape and size of leaves and involucre, resembling in this regard such polymorphic species as *H. umbellatum* or *H. pilosella*.

170. ***H. gymnogenum*** Zahn in Ann. Ung. Nat. Mus. VIII (1910) 74; in Pflzr. IV, 280, 625; in Asch. and Graebn. Synopsis, XII, III, 143.—*H. alpinum* var. *subglabrum* Schur, Enum. Transs. (1866) 396.

Perennial. Stem 5–25 cm high, slender, sparsely pubescent with short blackish hairs, finely glandular above. Basal leaves obovate, oblong or lobed, more or less long-petiolate, olive-green, entire or slightly denticulate, hairs short, few (f. *brevipilum* Zahn) or more or less absent (f. *calvifolium* Zahn). Capitula solitary. Involucre 9–14 mm long, ovate or hemispherical; involucre bracts more or less obtuse to acute, moderately short-hairy and also with small glands. Corolla

teeth slightly ciliate; stigmas brownish-yellow. Flowering July to August.

Mountains in alpine zone, at 1400–2500 m.—*European Part*: Upper Dniester (Pope Ivan, Goverla, Pikui). *General distribution*: Central Europe (Eastern Alps). Described from Carpathians. Type in Budapest.

171. **H. crispum** Elfstr. Bot. utfl. (1890) 34; Hier. Alp. 14; Omang in Nyt. Mag. Nat. XXXVIII, 80; Zahn in Pflzr. IV, 280, 626.—**Exs.**: Dahlst. Hier. Scand. fasc. III, Nos. 6, 7, IV, Nos. 1, 2, IX, Nos. 8–10, XII, No. 8.

Perennial. Stem 15–30 cm high, moderately pilose with hairs 3–4 mm long, also glandular, glands 0.5–1.0 mm long. Basal leaves many (6–12), obovate, elliptical or oblong-spatulate, obtuse or subacute, to 10 cm long (3–9:1), remotely sinuate-toothed (prominently), crisped-wavy margins (particularly conspicuous in living specimens), scattered-pubescent with hairs 3 mm long and glands along margin, often violet or maculate. Capitula solitary. Involucres 14–18 mm long, ovate-rounded; involucre bracts in part loose, with divergent tips, acute, dark, with dense (100–200) hairs 4 mm long and dense (90–150), glands 0.1–0.2 mm long, without stellate hairs. Stigmas yellow (sometimes somewhat darker than florets). Flowering July to August. (Plate XX, Fig. 2.)

Tundra.—*Arctic*: Arctic Europe (Varzino), Arctic Siberia (Yalping-Ner, Berezov). *General distribution*: Scandinavia. Described from Scandinavia. Type in Stockholm.

Note. Zahn also included here two varieties: var. *marmoratum* Norrl. and var. *prasioglossum* Norrl. (*Nya nord. Hier.* II (1912) 72). *H. gracilentum* var. *varangerense* Elfstr. (*Sv. Bot. Tidskr.* VIII, 2 (1914) 207) is also very close to this species, which may be found in our country in the Murmansk Region.

160 172. **H. vitellicolor** Elfstr. Hier. Alp (1893) 36; Dahlst. in Acta horti Berg. II, 4, 46; Zahn in Pflzr. IV, 280, 626; Dahlst. in Lindm. Svensk Fan.-Fl. 2, ed. 609.—*H. alpinum* var. *vitellinum* Elfstr. Bot. utfl. (1890) 35; nec Norrl.

Perennial. Stem 15–25 cm high, 1.5–2.5 mm in diameter, very sparsely pubescent (at first glance glabrous) and densely glandular (in upper part glands to 0.4 mm long), with rare stellate hairs, densely pubescent above. Basal leaves 4–12, large, outer rounded-elliptical, obtuse, more or less glabrous, inner broadly oblong, lanceolate, narrowed to long and narrow, winged petiole, with unequal falcate teeth, sparsely pilose, but distinctly glandular; cauline leaves 1(–2) (coefficient of leafiness 0.07), lower leaf well-developed, narrowly lanceolate, narrowed to short,

winged petiole, toothed, like inner basal leaves, with glands and with traces of stellate hairs along midrib beneath. Inflorescence with 1(2–3) capitula. Involucres 11–14 mm long, with rounded or truncate base, involucre bracts blackish-green, outer more or less obtuse, apically barbate, inner narrower, acute, not barbate, moderately (50–60) covered with fine gray hairs 2.5 mm long, densely (70–85) glandular with glands 0.1–0.4 mm long, without stellate hairs. Corolla orange-yellow (color of yolk), corolla lobes ciliate; stigmas yellow or orange. Flowering July to August.

Tundra and mountains in birch stands.—*European Part*: Volga-Kama (Urals). *General distribution*: Scandinavia. Described from Scandinavia. Type in Stockholm.

173. **H. melanocephalum** Tauch in Flora, XI (1828) Erg.-Bl. I, 63; (1837) 67; Zahn in Koch, Synopsis, 3, III, 1841; in Pflzr. IV, 280, 627; in Asch. and Graebn. Synopsis, XIII, III, 145.—*H. melanocephalum* Tausch var. *kolaicola* Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 203.—*H. atricapillum* Hoppe in Flora (1831) 184.—**lc.**: Rchb. Ic. XIX, 2, t. 129 A.—**Exs.**: Rehm. and Wol. Fl. Pol. exs. No. 195; Zahn, Hier. Europ. No. 652; Petrak. Nos. 281, 282; Baenitz. Herb. Europ. No. 3021.

Perennial. Stems 10–30 cm high, 1.5–2 mm in diameter (less often slender and prostrate), solitary or 2–3, pubescent with gray and dark bristles, 3–5 mm long, with short dark glands, more prominent above (sparse to scattered). Basal leaves long, obovate, oblong-spatulate or narrowly oblong-lanceolate, narrowed to long, broadly winged petiole, crisped-wavy, sparsely (finely) toothed or with many teeth, or almost entire (var. *kolaicola* Elfstr.), more or less moderately pubescent; cauline leaves 1–3 (coefficient of leafiness 0.10), entire, densely glandular. Inflorescence unicapitulate (less often 2–3 capitula). Involucres (12–)14–18 mm long (broader than long); involucre bracts numerous, lanceolate, obtuse to acute, very densely, 150(95–250), pilose, hairs to 3 mm long, and with dense, 135(75–175), glands 0.1–0.3 mm long without stellate hairs; corolla teeth ciliate, stigmas yellow. Flowering
161 July to August.

Mountain at 1600–2200 m and in arctic tundra.—*European Part*: Upper Dniester (Chorna Mountain, Pikui, Marmarosh), Arctic (variety); Murmansk Region, Kanin. *General distribution*: Scandinavia, Central Europe (Central and Eastern Alps, Carpathians). Described from Sudeten? Type unknown.

Note. Variety *kolaicola* Elfstr. (*Hier. Alp.* (1914); *Sv. Bot. Tidskr.* VIII, 2 (1914) 203). It differs from the type species by having leaves with an almost entire margin, a less dark involucre, hairs and glands on upper surface of leaves sparser and narrower involucre bracts.

This variety is found in our country in the Murmansk Region (near Kandalaksha) and in the Kanin Peninsula.

174. **H. folioliferum** Elfstr. Arch. Norw.-Finnm. (1894) 8; Zahn in Engl. Pflzr. IV, 280, 627.—*H. teligerum* Norrl. in Mela-Cajander, Suom. Kasvio (1906) 678; Nyia nord. Hier. II, 96, cum descr.—Exs.: Norrl. Hier. exs. fasc. VII, Nos. 24–27.

Perennial. Stem 10–20 cm high, often long-branched from base, branches with small leaves, like stem densely covered with hairs 3 mm long, densely dark-glandular above. Basal leaves elliptical-spatulate or lanceolate, outer long-petiolate, yellowish-green, almost entire, densely pilose; cauline leaves 2–5 (coefficient of leafiness 0.23), lower ones well developed, lanceolate, acute, others bracteal. Inflorescence unicapitulate (rarely more capitula, with a single capitulum at end of each branch). Involucres 13–16 mm long (on branches much shorter); involucre bracts acute, dark, densely pubescent and glandular; corollas short or somewhat undeveloped, teeth ciliate; stigmas yellowish-brown. Flowering July to August.

Tundra.—*European Part*: Karelia-Lapland (Niva River). *General distribution*: Scandinavia. Described from Scandinavia. Type in Stockholm.

Cycle 2. **Apiculata** Juxip.—*Grex H. apiculatum* Zahn in Asch. and Graebn. Synopsis, XII, III (1936) 139.—Stigmas yellow, later turning brown; plants bright grassy-green; leaves densely and coarsely toothed.

175. **H. apiculatum** Tausch in Flora, XX (1837) Erg.-Bl. I, 70; Zahn in Pflzr. IV, 280, 632; in Asch. and Graebn. Synopsis, XII, III, 152.—*H. eximium* var. *calenduliflorum* Uechtr. in Fiek Fl. Schles. (1881) 267.—*H. alpinum* ssp. *calenduliflorum* Zahn in Koch, Synopsis, 3, III, 1842; non Backh.— *Ic.*: Zahn in Pflzr. (l. c.), fig. 49, A.—*Exs.*: Zahn, Hier. Europ. No. 654.

162 Perennial. Stem 15–35 cm high, thickish, solitary or 2–3, densely long-pilose (3–5 mm), moderately glandular (more densely and with larger glands above.) Basal leaves small to quite large, narrowed to long base or broadly winged petiole, outer elliptical or narrower, lobed, obtuse, more or less toothed, inner lanceolate, short-toothed or more often unevenly sinuate or almost lobed, sometimes with antrorse teeth, moderately pubescent, with small glands, light green; cauline leaves 3–5(–8) (coefficient of leafiness 0.25), reduced upward, oblong-lanceolate, acute, sharply serrate, upper ones with rare stellate hairs along midrib beneath. Inflorescence uni-(rarely 2–3) capitulate. Involucres 18–20 mm long, quite broad; involucre bracts dark, obtuse (inner



acute), outer green, leafy, very densely hairy and glandular. Stigmas yellow or yellowish-brown, later turning dark. Flowering July to August.

Mountains at (800–)1300–2400 m.—*European Part*: Upper Dniester (Carpathians). *General distribution*: Central Europe (Sudetes Tatry). Described from Sudeten? Type unknown.

Subsection 2. Nigrescentia Juxip.—*Alpina nigrescentia* Eflstr. Hier. Alp. (1893) 41 p. p.; Norrl. in Mela-Cajander, Suom. Kasvio, 680 p. p.; Dahlst. in Lindm. Svensk. Fan.-Fl. 2, ed. 598 p. p.—*H. nigrescens* Willd. Sp. pl. III, 3 (1800) 1574 (s. l.); Zahn in Pflzr. IV, 280, 636; in Asch. and Graebn. Synopsis, XII, III, 158; Krylov, Fl. Zap. Sib. XI, 3054, p. p.—*H. atratum* Bab. Man. Brit. Fl. 3 (1851) 196; non Fr.—*H. alpinum* auctor. scand. p. p.—Stem often tall; inflorescence often multicapitate; involucre large to medium, involucre bracts tightly appressed; basal leaves spatulate or lanceolate, with broad, more or less clearly defined lamina and long petiole, always (at least along margin) finely glandular; stigmas dark to black (rarely yellowish-brown); achenes shorter than in members of subsection *Alpina vera*, black.

A highly polymorphic subsection.

Cycle 3. Decipientia Juxip.—Inflorescence 1(2-)capitate; coefficient of leafiness medium (0.07–0.13). In habit plants very reminiscent *H. alpinum* (Grex *H. decipiens* Zahn in Pflzr. IV, 280, 637, ex parte).

176. **H. iremelense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 480.—*H. oncodes* Om. var. *iremelense* Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 212, 219; Zahn in Pflzr. IV, 280, 667.

Perennial. Stem 18–25 cm high, 1.5–3 mm in diameter, green, moderately pilose throughout with hairs 2.5–5 mm long (denser above), sparsely glandular and in upper part stellate-hairy. Basal leaves 6(4–10), obovate, spatulate to oblong-lanceolate, to 12 cm long, gradually narrowed to winged base, weakly denticulate, more or less acute, 165 plicate (6.5:1), with scattered hairs 1.5–3 mm long, with few glands and stellate hairs along margin; cauline leaves (1–)2–3, (coefficient of leafiness 0.12) lanceolate, sessile, somewhat narrowed toward semiamplexicaul base, uppermost leaf below inflorescence linear. Inflorescence with 1 capitulum (rarely 2). Involucre 14–17 mm long, ovate, involucre bracts to 2 mm wide, acute, quite densely covered, 137(120–180), with hairs 3–5 mm long; densely, 104(80–125) glandular with glands 0.1–0.3 mm long, without stellate hairs. Corolla teeth densely ciliate; stigmas dark. Flowering July to August.

Subalpine and alpine meadows in mountains and arctic tundra.—*Arctic*: European Arctic (Malozemelskaya and Bolshezemelskaya

tundra, Northern Urals); *European Part*: Volga-Kama (Central and Southern Urals), to Iremel Mountain. Described from Urals. Type in Leningrad.

Note. It is necessary, apparently, to include *H. apiculatiforme* Elfstr. in this species (in *Sv. Bot. Tidskr.* VIII, 2, 213, 219; *Pflzr.* IV, 280, 632)—a species, in any case, quite close to *H. iremelense* Juxip; it differs only by shorter (13 mm long) involucre but in all other characters is similar to *H. iremelense* (described from Denezhkin Kamen).

177. **H. omangii** Elfstr. in *Sv. Bot. Tidskr.* VIII, 2 (1914) 210, 219; Zahn in *Pflzr.* IV, 280, 663.—*H. calenduliflorum* var. *inciliatum* Elfstr. *Arch. Norw.-Finnm.* (1894) 24.—*H. spatulops* Om. in *Nyt. Mag. Nat. L.* (1912) 157.

Perennial. Stem 12–30(–40) cm high, 1–3 mm in diameter, darker above, scatteredly (rarely moderately) covered with hairs 1.5–3 mm long (denser above), with glands 0.2–0.5 mm long throughout (to moderate). Basal leaves 7(3–9), oval, obtuse, to lanceolate and acute, more or less abruptly narrowed to petiole, to 14 cm long (5.5:1), all leaves with 3–5 triangular teeth, more prominent at base of lamina, sparsely short-hairy above, scattered beneath, with occasional glands along margin; cauline leaves 2(1–4) (coefficient of leafiness 0.10), lanceolate, petiolate, like inner basal leaves, somewhat more densely pubescent, upper leaves linear, sessile, with entire margin. Inflorescence unicapitulate (rarely 2). Involucres 13–16 mm long; involucre bracts acute, with quite dense, 117(80–165), hairs 2–4 mm long, densely glandular, 89(55–122), glands 0.3 mm long, without stellate hairs. Stigma yellow, later turning dark (typical) or abruptly dark (var. *leptopholis* Elfstr. l. c.). Achenes 4 mm long. Flowering July to August.

Tundra zone.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from Norway, variety from Murmansk Region. Type in Stockholm; paratype in Leningrad.

Note. Evidently, only a variety is found in our country.

178. **H. comosum** Elfstr. *Arch. Norw.-Finnm.* (1894) 17; in *Sv. Bot. Tidskr.* VIII, 2, 210, 219; Zahn in *Pflzr.* IV, 280, 641.

166 Perennial. Stem 14–28 cm high, 1–2 mm in diameter, green, with scattered hairs 2–4 mm long, somewhat sparsely or moderately glandular above (f. *glandulosius* Elfstr.), glands 0.4–1 mm long, somewhat stellate-hairy. Basal leaves 5(3–8) outer obovate or spatulate, obtuse, inner up to broadly-lanceolate, narrowed to petiole, to 14 mm long (6:1), scatteredly denticulate or mostly entire (var. *subintegratum* Elfstr.), scatteredly or moderately hairy, glandular along margin; cauline leaves (1–)2(–3) (coefficient of leafiness 0.10), lanceolate, acute, slightly

stellate-hairy along midrib beneath. Unicapitulate (very rarely 2–3 capitula); peduncles with occasional hairs and few glands, tomentose. Involucres 13–16 mm long (or 11–12 mm—var. *praecisum* Elfstr.); involucre bracts mostly more or less obtuse, inner acute, with dense, 86(60–135), hairs 2–3 mm long and very dense, 113 (60–155), glands 0.1–0.5 mm long, comose at tip, without stellate hairs. Corolla teeth ciliate; stigmas blackish. Flowering July to August (September). (Plate IX, Fig. 2.)

Tundra, in spruce forests, elfin birch woodlands, dwarf birch tundra, on rocks and moraines.—*European Part*: Karelia–Lapland. *General distribution*: Scandinavia. Described from Norway (f. *glandulosus* and var. *praecisum* from Khibiny). Type in Stockholm; paratypes in Leningrad.

179. **H. glabriligulatum** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 678; Nya nord. Hier. II, 81; Zahn in Pflzr. IV, 280, 641 (nota).—**Exs.**: Norrl. Hier. exs. fasc. VII, No. 23.

Perennial. Stem 20–30 cm high, 1.5 mm in diameter, straw-greenish, moderately covered with hairs 1.5–2 mm long (mostly above) and glands 0.2–0.5 mm long. Basal leaves 9, quite large (to 8 cm long), obovate, spatulate to lanceolate, narrowed to long petiole, obtuse, (2–6:1), to scattered-hairy, with scattered glands along margin, without stellate hairs; cauline leaves 2–3 (coefficient of leafiness 0.10), lanceolate, acute, entire. Capitula one. Involucres 14–15 mm long; involucre bracts acute, densely (80) pubescent with hairs 3 mm long and very densely (130) glandular with glands 0.2–0.4 mm long, without stellate hairs. Corolla teeth ciliate; stigmas black. Flowering July to August.

Banks of lakes.—*European Part*: Karelia–Lapland. Endemic. Described from Murmansk Region (Lake Lovozero). Type in Helsinki; paratype in Leningrad.

180. **H. adpersum** Norrl. in Acta Soc. Fa. et Fl. Fenn. III, 4 (1888) 76; Elfstr. Hier. Alp. 16; Elfstr. in Sv. Bot. Tidskr. VIII, 2, 213, 220; Zahn in Pflzr. IV, 280, 647; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 609.—**Exs.**: Norrl. Hier. exs. Nos. 84, 85; Dahlst. Hier. Scand. fasc. III, Nos. 8–12, IX, Nos. 13–17, XXIII, No. 17.

Perennial. Stem 15–30 cm high, 1.5–2.5 mm in diameter, straw-colored, with scattered hairs 3 mm long, with few glands (or with larger
167 glands and to moderately glandular.—var. *gawrilowae* Elfstr.). Basal leaves (1–)2–8, outer obovate or spatulate, quite abruptly narrowed to petiole, obtuse, inner lanceolate, gradually narrowed to more or less winged petiole, acute, to 11 cm long (5.5:1), all leaves entire,

dark green, very sparsely or scatteredly hairy, scattered-glandular along margin and stellate-hairy at least beneath (or without stellate hairs—var. *gawrilowae* Elfstr.); cauline leaves 2(1–5) (coefficient of leafiness on average 0.08), lanceolate, narrowed toward base, acute, entire, stellate-hairy on both sides (or without such hairs—var. *gawrilowae* Elfstr.): Inflorescence with 1 (2–4) capitulum; peduncles with occasional hairs and scattered glands. Involucres 12–16 mm long, ovoid; involucre bracts dark green, with violet tips, moderately (60) or densely, 90(75–107), hairy—var. *gawrilowae* Elfstr. and with scattered, (30), glands 0.1 mm long or densely, 71(67–82), glandular with glands 0.2–0.5 mm long—var. *gawrilowae* Elfstr.; without stellate hairs. Corolla teeth ciliate; stigmas yellow, yellowish-brown, or dark (var. *gawrilowae* Elfstr.). Flowering July to August.

Moss-lichen tundra.—*European Part*: Karelia-Lapland (until now only the variety is known, which apparently is endemic). *General distribution*: Scandinavia. Described from Sweden; variety from Kola Peninsula (Gavrilovo, Kildin Island, Khibiny Mountains). Type in Stockholm; cotype of variety in Leningrad.

Note. As is evident from the description, the variety differs from the type of the species by having a larger number of bigger glands, denser hairiness, stellate hairs on the leaves, and dark stigmas. We present, however, a parallel description of the species as well, since the same species can be found in the northwestern part of the Kola Peninsula. Apparently, it replaces *H. decipiens* Tausch. in the north.

181. **H. decipiens** Tausch in Flora, XI (1828) Erg.-Bl. I, 66; Zahn in Pflzr. IV, 280, 641.—*H. eu-decipiens* Zahn in Asch. and Graebn. Synopsis, XII, III (1936) 163.—*H. nigrescens* var. *integrifolium* Tausch, l. c., non Fr. Epicr. (1862) 45.—**lc.**: Hegi, Ill. Fl. VI, 2, fig. 923, A.—**Exs.**: Fl. exs. Austro-Hung. No. 3338; Zahn, Hier. Europ. No. 659.

Perennial. Stem 10–40 cm high, flexuous, moderately or quite densely covered with dark hairs, throughout (more prominently above) glandular and stellate-hairy. Outer basal leaves short-petiolate, ovate or spatulate, more or less entire, inner long-narrowed, oblong to narrowly-lanceolate (often large), obtuse, spinescent or acuminate, fine- or short-sinuate toothed (occasionally with more or less large teeth), with scattered hairs 2–2.5 mm long; cauline leaves 2–3(–6) (coefficient of leafiness 0.10–0.20), oblong to lanceolate-linear, sessile, with tapered base, lower somewhat toothed, others acute, transitional to apical leaves. Capitula solitary (very rarely more). Involucres 12–15–16(–18) mm long; involucre bracts blackish, subacute or acute to densely (45–80) pilose with light hairs, 2–3 mm long, with dark base, densely,

(80–120), glandular, glands 0.2–0.5 mm long, without stellate hairs. Stigmas dark. Flowering July to August.

Mountains, at 800–1900 m.—*European Part*: Upper Dniester (Chorna Mountain, Grofa, Petosh). *General distribution*: Central Europe. Described from Sudeten. Type unknown.

182. **H. akjause** Norrl. *Nya nord. Hier.* II (1912) 93; Zahn in Pflzr. IV, 280, 646.

Perennial. Stem 20 cm high, at base moderately covered (decreasing upward) with hairs to 2 mm long, and with fine glands throughout (denser above), stellate-hairy, below inflorescence weakly tomentose. Basal leaves glaucous-green, short-petiolate, almost entire to weakly toothed, outer broadly elliptical or obovate; more or less glabrous, inner elliptical to oblong or lanceolate, moderately pubescent, without stellate hairs; cauline leaves 1(–2) (coefficient of leafiness 0.07), lower small, linear, borne in middle of stem, without stellate hairs, upper bracteiform, black. Capitula 1 (or 2). Involucres 11–13 mm long; outer involucre bracts linear, obtuse, middle linear-lanceolate, subacute, inner cuneate, dark, with dense, short, black hairs and with sparse glands, without stellate hairs. Florets sulfur-yellow; corolla teeth distinctly ciliate; stigmas blackish; pappus quite white. Flowering August.

Dry sandy slopes overgrown with lichens and scrubs and on wet slopes.—*Arctic*: Arctic Europe. Endemic. Described from Murmansk Region (Ponoi, between Akyaur and Sosnova monastery). Type in Helsinki.

183. **H. petiolatum** Eflstr. Bot. utfl. (1890) 36; Eflstr. *Hier. Alp.* 18; non Lint., nec Brenn.; Norrl. in Mela-Cajander, *Suom. Kasvio*, 678; Zahn in Pflzr. IV, 280, 647; Dahlst. in Lindm. *Svensk Fan.-Fl.* 2 ed. 610.—*Exs.*: Dahlst. *Hier. Scand. fasc.* XII, No. 11, XVIII, No. 73, XX, No. 39.

Perennial. Stem 14–38 cm high, 1–3 mm in diameter, green, sparsely covered with hairs 1–3 mm long, scattered-glandular throughout. Basal leaves 6(3–8), obovate, spatulate or lanceolate, narrowed to long petiole, to 16 cm long (7:1), entire or with 3–5 remote, fine teeth, green, with scattered hairs 0.6–1.5 mm long on both sides, scattered-glandular along margin; cauline leaves 2(1–4) (coefficient of leafiness 0.10),
 169 narrowly lanceolate or rhombic, considerably smaller than basal leaves, upper leaves, borne below inflorescence, linear. Capitula 1 (rarely 2) (peduncles with occasional hairs, moderately glandular). Involucres 11–14 mm long, turbinate; involucre bracts acute, blackish-green, moderately, 52(30–65), hairy, hairs 1–2.5 mm long, very densely, 128(95–178), glandular, glands 0.3 mm long, without stellate hairs. Corolla

teeth sparsely or densely ciliate (var. *ciliatidens* Elfstr.); florets dark- or saffron-yellow; stigmas dark. Flowering July to August.

Birch and coniferous forests and meadow patches in tundra.—*Arctic*: Arctic Europe; *European Part*: Karelia-Lapland, Dvina-Pechora(?). *General distribution*: Scandinavia. Described from Scandinavia. Type in Stockholm.

Note. In the original diagnosis of Elfstrand (l. c.), the length given for the involucre is 14–16.5 mm, and these data were taken from there by Norrlin, Zahn, and Dahlstedt in their cited works. However, in our specimens, in part identified by Elfstrand himself, such large involucres are not found, their length varying between 11 and 14 mm.

In the monograph of Zahn (l. c.) besides the Kola Peninsula, the Pechora River is also mentioned as a place where this species occurs. However, we could not find plants from there in our material. Moreover, finding the species there after such a considerable gap in time is extremely doubtful.

184. **H. flexicaule** Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 207, 218; Zahn in Pflzr. IV, 280, 649 (nota); non Arv.-Touv. (1902); nec Freyn and Vand. (1895), nec Tausch (1828).

Perennial. Stem 14–30 cm high, 1–2 mm in diameter, flexuous, green, scattered-pilose, moderately glandular (glands 0.3–0.6 mm long) throughout and somewhat stellate-hairy. Basal leaves 6(3–8), outer oval or spatulate, inner oblong-lanceolate, mostly obtuse, almost entire or with rare, fine teeth, to 13 cm long (6:1), scattered-pubescent on both sides with hairs 0.6–2 mm long; glandular along margin and beneath; cauline leaves (1–)2–3 (coefficient of leafiness 0.11), lower leaves linear-lanceolate, acute, upper linear; all leaves entire, sparsely stellate-pubescent beneath along midrib and margin. Capitula 1 (rarely 2). Involucres 11–12.5 mm long; involucre bracts blackish-green, obtuse, inner partly narrow and acute, with scattered 46(28–74), hairs, 1.5–2 mm long (with black base) and with very dense, 128(90–172), glands 0.1–0.5 mm long, without stellate hairs. Corolla teeth distinctly ciliate; stigmas yellow; achenes 3.2 mm long. Flowering July to August.

Stony, shrubby tundra, in subalpine and alpine zones.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region (Chunatundra). Type in Leningrad.

Note. Quite close to *H. petiolatum* Elfstr. in characters, differing from it only by the yellow stigmas.

170 185. **H. naniceps** Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 209, 219; Zahn in Pflzr. IV, 280, 663 (nota).

Perennial. Stem 14–35 cm high, somewhat flexuous, sparsely pubescent with hairs 1.0–2.5 mm long, with sparse glands 0.3 mm long

(along entire stem) and densely stellate-hairy above. Basal leaves 5(2–8), outer spatulate or elliptical, inner oval to lanceolate, more or less abruptly or gradually narrowed to petiole, to 15 cm long (6:1), more or less entire or with 3–4 fine teeth, glabrous or with occasional hairs above, with occasional hairs 0.5–1.5 mm long beneath and along margin, margin also with few glands; cauline leaves 1–2(–3) (coefficient of leafiness 0.10), generally only lower leaf well-developed, narrowly lanceolate or narrowly linear (9:1), acute. Capitula 1, very rarely 2; peduncles with occasional hairs and sparsely glandular, tomentose. Involucres 10(8–12) mm long, turbinate; involucre bracts linear, outer more or less obtuse, inner acute, barbate at tip, with scattered 40 (30–56), hairs 1.0–1.5 mm long (with dark base and light tip), moderately, 52(28–78), glandular with glands 0.3 mm long, without stellate hairs. Florets tubular; corolla teeth eciliate; stigmas dark. Flowering July to August.

Forest glades in montane spruce-birch forests, by rocks in herb tundra, in subalpine and alpine meadow patches.—*Arctic*: Arctic Europe; *European Part*: Karelia-Lapland. Endemic. Described from the Khibiny Mountains.

Cycle 4. *Frondifera* Juxip.—Inflorescence of 1(2) capitula; coefficient of leafiness quite high (0.14–0.20).

186. ***H. frondiferum*** Elfst. Bot. utfl. (1890) 38; Hier. Alp. 21; in Sv. Bot. Tidskr. VIII, 2, 213, 219; Zahn in Pflzr. IV, 280, 650; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 609; Samuelsson, Maps of Scand. Hier. sp. No. 16.—**Exs.**: Dahlst. Hier. Scand. fasc. III, No. 17, IX, No. 202; Norrl. Hier. exs. fasc. I, No. 86.

Perennial. Stem 10–35 cm high, simple, with long, soft hairs with quite dense glands above (0.5 mm long) and with rare stellate hairs. Basal leaves 2–10, outer small, ovate, elliptical or spatulate, short-petiolate, obtuse, inner oblong or spatulate-lanceolate, gradually narrowed to petiole, narrow, more or less acute, dark green, mostly entire or with few remote teeth, more or less pilose, without or with few stellate hairs along midrib beneath; cauline leaves 2–3(–5) (coefficient or leafiness 0.15), narrowly oblong to linear, lower narrowed to winged petiole, upper sessile, acute, markedly reduced. Capitula 1 (rarely 2–3). Involucres 12 mm long (var. *wologdense* Elfstr.) or 13–16 mm long, 171 with round broad base; involucre bracts blackish-green, outer quite broad, obtuse, mostly standing loosely (thus forming something like “outer involucre”), inner narrower, acute, partly with white-haired tuft at tip, quite densely pilose with long, thin, light gray hairs, mostly densely glandular (glands 0.1–0.5 mm long), without stellate hairs.

Florets light (sulfur) yellow; corolla teeth ciliate; stigmas very dark (rusty brown). Flowering August.

Mountains in elfin birch forest zone, to 1500 m.—*European Part*: Dvina-Pechora. *General distribution*: Scandinavia. Described from Scandinavia, variety from Vologda Region (Shchugor River). Type in Stockholm.

Note. The description is based on Elfstrand's diagnosis (l. c.). We were unable to see authentic specimens (or paratypes). The plant is conspicuous because of its bright flowers and small dark involucre and stigmas.

According to Samuelsson (l. c.), this species is found in southern Norway and the adjoining western part of Sweden; thus, being, apparently, an Atlantic element of the flora, endemic to this region. Possibly, Elfstrand's variety should be split off as a separate species.

187. **H. modiciforme** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 480.

Perennial. Stem 14–20 cm high, 1.5 mm in diameter, flexuous, weakly pubescent with light hairs 2–3 mm long, to scattered-glandular (glands 0.2–0.4 mm long) and more or less conspicuously stellate-hairy (often several stems from one rhizome). Basal leaves 7–10, lanceolate, narrowed to petiole, acute, more or less distinctly toothed, on both sides and along margin moderately or densely, as a whole to densely short-pubescent (glands 1 mm long), (unusual for species of the section), and along margin finely glandular; cauline leaves 2–3 (coefficient of leafiness 0.18), linear-lanceolate, entire, stellate-hairy along midrib beneath. Inflorescence of 1 (less often 2) capitula, peduncles pubescent with hairs 3 mm long and with scattered glands 0.5 mm long, tomentose. Involucre 12 mm long; involucre bracts more or less narrow, acute, densely, 93(78–115), light-pilose, (hairs 2–5 mm), densely, 78(45–110), glandular (glands 0.3–0.5 mm long), without stellate hairs. Corolla teeth ciliate; stigmas black. Flowering July.

Around rocks in tundra.—*European Part*: Karelia-Lapland. Endemic. Described from the Khibiny Mountains (Yukspär). Type in Kirovsk.

Note. This species is close to *H. modicum* Norrl., but differs by its very dense pubescence of the leaves, which is unusual for subsection *Nigrescentia*.

188. **H. coloratum** Eflstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 206, 218; Zahn in Pflzr. IV, 280, 627 (nota).

Perennial. Stem 15–25 cm high, thickish, violet, scatteredly or quite densely covered with dark hairs and glands (particularly prominent in

upper part), mixed with stellate hairs. Basal leaves more or less numerous, outer oblong, obovate or spatulate, inner oblong-lanceolate or ligulate, more or less coarsely toothed, violet, pubescent, with few stellate hairs along midrib; cauline leaves mostly 3 (coefficient of leafiness 0.15), lowermost narrowly lanceolate to ovate-linear, others very small, narrow, linear, quite acute. Inflorescence with 1, rarely 2–3 capitula. Involucres 12–14 mm long; involucre bracts narrow, acute, dark, very densely hairy, hairs long, smoky, with long black base, with more or less sparse thin, dark glands, without stellate hairs. Corolla mostly tubular, weakly ciliate; stigmas blackish-brown. Flowering August.

Arctic: Arctic Europe (Kanin Peninsula). Endemic. Described from Kanin. Type in Stockholm.

Note. The species was described based on Elfstrand's diagnosis. This species links subsections *Alpina vera* and *Nigrescentia*.

189. **H. l'japinense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 481.

Perennial. Stem 14–26 cm high, 1.0–1.5 mm in diameter, scatteredly pubescent, sparsely glandular throughout, stellate-hairy above. Basal leaves 5(3–8), oval, spatulate to lanceolate, narrowed to petiole, obtuse to acute (6:1), outer entire, inner denticulate, with both sides, scattered-pubescent, with hairs 1 mm long, with occasional tiny glands along margin; cauline leaves 2–3 (coefficient of leafiness 0.15), bottom leaf similar as a whole to inner basal leaves, upper sessile, narrowed toward base, entire (8:1). Unicapitulate. Involucre 12–14 mm long, turbinate; involucre bracts moderately pilose, 55(50–60), with hairs 2 mm long, densely, 100(85–120), glandular with tiny glands (0.1–0.3 mm long), without stellate hairs. Corolla teeth ciliate; stigmas yellowish-brown, later turning dark. Flowering July to August.

Along stream banks, subalpine, meadow patches.—*Arctic:* Arctic Europe (Northern Urals), Arctic Siberia. Endemic. Described from Polar Urals (basin of Lyapina River). Type in Leningrad.

Note. It is distinguished from the closely related species *H. phyllodes* Norrl. by its densely glandular involucre bracts and yellowish-brown stigmas.

190. **H. pyrsjuense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 481.

Perennial. Stem 20 cm high, 1 mm in diameter (sometimes 2 stems from one root), moderately hairy (more distinctly in upper half) and to moderately glandular, glands more conspicuous and longer above, to 0.6 mm long. Basal leaves 5–6, of different size, obovate to lanceolate, some abruptly and others gradually narrowed to petiole, outer

- 173 mostly entire, inner finely crenate, plicate, light green, both sides with scattered short pubescence (1 mm long), along margin with few tiny glands; cauline leaves 3 (coefficient of leafiness 0.15), bottom one shaped like inner basal leaves, others entire, upper linear. Unicapitulate. Involucres 13.5 mm long, turbinate, involucre bracts narrow, lanceolate, moderately (60) pubescent (hairs 2.5 mm long) and moderately (50) glandular (glands 0.1–0.5 mm long), without stellate hairs. Corolla teeth weakly ciliate; stigmas dark. Flowering July to August.

Granitic mountain slopes, above tree-line.—*Arctic*: Arctic Europe (Northern Urals). Endemic. Described from the headwaters of Pysryu River. Type in Leningrad.

Note. In habit it is similar to *H. polymorphophyllum* Elfstr., differing from it mainly in the number of glands on the involucre bracts.

191. ***H. pseudophyllodes*** Zahn in Pflzr. IV, 280 (1921) 650.—*H. phyllodes* Norrl. Nya nord. Hier. II (1912) 95; non Dahlst.

Perennial. Stem 20–30 cm high, quite densely pubescent with hairs 2 mm long (more conspicuous above), with small glands throughout (denser above) and stellate hairs (tomentose below inflorescence). Basal leaves quite large, light green, elongated into petiole, oval to obovate-oblong, with 1–2 broad and quite acute teeth at base, more or less glabrous above, rarely pubescent beneath and along margin with hairs 1.5 mm long, without stellate hairs; cauline leaves 3–5 (coefficient of leafiness 0.16), lower leaf well developed, long-petiolate, obovate to lanceolate, from base to middle with occasional teeth, toward tip entire; middle leaves smaller, linear or narrowly lanceolate, entire, quite densely pubescent, upper leaves bracteiform. Inflorescence of 1(–2) capitula, often dichotomous. Involucres 12–13 mm long, broad; involucre bracts blackish-green, linear, mostly obtuse, with occasional hairs 2 mm long gray and equally rare glands, without stellate hairs. Corolla sulfur yellow; ligule teeth ciliate; stigmas dark to black. Flowering August.

Tundra.—*European Part*: Arctic Europe. Endemic. Described from Murmansk Region (Pechenga). Type in Helsinki.

Cycle 5. Excubita Juxip.—Inflorescence of 1(–2) capitula, coefficient of leafiness high (0.25), i.e., to 9 cauline leaves.

192. ***H. uralense*** Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 212, 219, Zahn in Pflzr. IV, 280, 667 (nota).

Perennial. Stem 13–25 cm high, 1.5–3.0 mm in diameter, flexuous, green, more or less uniformly covered with dense hairs 3–4 mm long, with scattered (more prominent above) glands 0.2–0.5 mm long, and stellate hairs. Basal leaves at anthesis 6(4–9), oblong-ovate to narrowly

174 lanceolate, to 12 cm long (6:1), gradually narrowed to petiole, almost entire, weakly pubescent, with occasional tiny glands along margin; cauline leaves (2-)5-6, (coefficient of leafiness 0.25), lanceolate to linear-lanceolate, acute, gradually reduced. Capitula solitary (rarely 2). Involucres 14-17 mm long, truncate; outer involucral bracts somewhat narrow and obtuse, inner narrow and acute, very densely, 120(90-150) pubescent with hairs 3-5 mm long, with scattered, 43(35-55), glands 0.1-0.2 mm long, without stellate hairs. Ligule deeply incised, but weakly ciliate; stigmas dark brown. Flowering July to August.

Gravel beds, montane lichen forests, tundra, elfin birch woodlands—*European Part*: Dvina-Pechora; *Western Siberia*: Arctic (Urals). Endemic. Described from former Vologda Region (near Sabel Mountain). Type in Leningrad.

193. **H. excubitum** Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 202, 218; Zahn in Pflzr. IV, 280, 650.—*H. personatiforme* Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 111.

Perennial. Stem 10-30 cm high, 1.0-2.5 mm in diameter, flexuous, at base reddish, scatteredly covered with hairs 1.5-3.0 mm long and glands 0.4 mm long and somewhat (denser above) stellate-hairy. Basal leaves at anthesis 5(0-6), mostly lanceolate-spatulate or oblong, often some withering; cauline leaves 4-7(-9) (coefficient of leafiness 0.25) narrowly lanceolate to linear-lanceolate (7.5:1), acute, lower long petiolate, gradually reduced upward, to narrowly linear, lanceolate, indistinctly petiolate and somewhat semiamplexicaul; all leaves entire (or with 1-2 very small teeth), weakly covered on both sides with bristles 1.0-2.5 mm long, along margin with occasional tiny glands, slightly stellate-hairy (as also along midrib beneath). Capitula solitary (rarely 2). Involucres (10-)12-15 mm long, ovate; involucral bracts narrow and very acute, densely (conspicuously), 84(67-123), pilose, with light hairs 2-5 mm long and blackish base, and equally dense, 85(75-122), glands 0.1-0.3 mm long, without stellate hairs. Ligule deeply incised, ciliate; stigmas yellowish-brown. Flowering July to September. (Plate XIII, Fig. 2.)

Sandy riverbanks, mixed and coniferous forests.—*European Part*: Arctic Europe; *Western Siberia*: Arctic Siberia. *General distribution*: Scandinavia. Described from Arkhangelsk Region (Northern Urals, Usa River). Type in Leningrad.

Cycle 6. Nigrescentia Juxip.—Inflorescence 1-3(-6)-capitulate; coefficient of leafiness low (0.03-0.06).

194. **H. bimanum** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 681; Nya nord. Hier. II, 118; Zahn in Pflzr. IV, 280, 666 (nota).

Perennial. Stem 30–40 cm high, scatteredly hairy. Basal leaves
 175 2–3, ovate or lanceolate, narrowed to long petiole, denticulate, densely
 short-pubescent, without stellate hairs; cauline leaves 1–2 (coefficient
 of leafiness 0.04), lanceolate, bottom leaf narrowed to long petiole,
 stellate hairy beneath, upper bracteiform. Inflorescence strongly di-
 chotomous, of 2–3 capitula; peduncles scatteredly pubescent and densely
 glandular. Involucres 11 mm long, involucral bracts lanceolate, obtuse,
 blackish-green, with dense, short, dark hairs, densely glandular, with-
 out stellate hairs, at tip barbate. Ligule teeth eciliate; stigmas dark.
 Flowering August.

European Part: Arctic Europe. Endemic. Described from Murmansk
 Region (Pechenga). Type in Helsinki.

195. **H. subincomptum** Zahn in Pflzr. IV, 280 (1921) 657.—
H. incomptum Norrl. Nya nord. Hier. II (1912) 108, non Neiceff and
 Zahn.—*H. impectum* Norrl. Hier. exs. fasc. VII (1906) No. 40.—**Exs.:**
 Norrl. l. c.

Perennial. Stem 25–40 cm tall, 2 mm in diameter, straw-green, with
 occasional hairs and glands. Basal leaves 6, oval to oblong-lanceolate,
 narrowed to more or less long petiole, toothed to pinnately lobed,
 acute, with scattered hairs (to 2.5 mm long above, to 1.5 mm beneath),
 with few glands along margin; cauline leaves 2 (coefficient of leafiness
 0.06), small, lanceolate, entire, more or less glabrous. Inflorescence
 dichotomous, with 3 capitula; peduncles weakly pubescent with hairs
 2.5 mm long and occasional glands 0.2–0.3 mm long, with scattered
 stellate hairs. Involucres 11–13 mm long; involucral bracts somewhat
 narrow and acute, densely hairy, 92(85–100), with hairs 3 mm long and
 dense, 97(91–104), glands 0.4 mm long, without stellate hairs, at tip
 barbate. Ligule deeply incised (2 mm) more or less eciliate; stigmas
 yellow. Flowering August.

Tundra.—*European Part:* Arctic Europe. Endemic. Described from
 Pechenga. Type in Helsinki; paratype in Leningrad.

196. **H. monczecola** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk
 SSSR, XIX (1959) 482.

Perennial. Stem 35 cm high, 2 mm in diameter, somewhat flexuous,
 straw-greenish colored, subglabrous, with few glands 0.2–0.4 mm long
 (more prominent in upper third). Basal leaves 5–8, obovate to lan-
 ceolate and narrowly lanceolate (3.5–8.5:1), more or less abruptly or
 gradually narrowed to somewhat winged petiole, with 2–3 small teeth,
 tips entire, with scattered, short pubescence, with few glands along
 margin; cauline leaves 2 (coefficient of leafiness 0.06), lanceolate, acute,
 more or less entire, distinctly glandular (glands 0.1–0.4 mm long)

along margin and beneath. Inflorescence strongly dichotomous, with 2 capitula; peduncles glabrous, moderately glandular with glands 0.5 mm long, with scattered stellate hairs. Involucres 11.5 mm long; involu-
 176 cral bracts somewhat narrow and acute; densely pubescent, 82(58–94), with hairs 2.5 mm long, moderately glandular, 58(44–66), with glands 0.3–0.2 mm long, without stellate hairs, at tip barbate. Flowering August. (Plate XIX, Fig. 2.)

Tundra.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region (Monche-tundra). Type in Leningrad.

Note. Elfstrand made the following remark on the label: “Eine sehr interessante Form, die mit *H. stenomischum* Om. verwandt ist. Mangel an Blüten macht vorläufig eine genauere Bestimmung unmöglich.” Nevertheless, on the basis of the well prepared plants it is possible to distinguish this form as a separate species, and attention should be turned to studying it.

197. **H. boreum** Elfstr. Arch. Norw.-Finnm. (1894) 20; Zahn in Pflzr. IV, 280, 659.

Perennial. Stem 15–25 cm high, 1.5–2.5 mm in diameter (sometimes with secondary shoots), with occasional hairs 2–3 mm long, scatteredly glandular throughout, stellate-hairy above. Basal leaves 7(4–10), oval to lanceolate, abruptly or somewhat gradually narrowed to petiole, to 8 cm long (4:1), very finely sharp-toothed, moderately hairy above, but densely covered beneath with hairs 1.5–2.0 mm long, along margin with tiny glands; cauline leaves 1(–2) (coefficient of leafiness 0.06), narrowly lanceolate or linear, acute, somewhat stellate-hairy beneath along midrib. Inflorescence strongly dichotomous, with 2–4 capitula; peduncles with few hairs 2 mm long, moderately (to densely) glandular, glands 0.4–1.0 mm long, tomentose. Involucres 13–16 mm long; inner involu-
 cral bracts acute, tips barbate, moderately, 63(53–70), pubescent with hairs 2 mm long, very densely, 123(92–150), glandular, glands 0.3 mm long, without stellate hairs. Corolla light yellow; ligule teeth of florets ciliate; stigmas dark; anthers with well developed pollen. Flowering July to August.

Stony places.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from Norway. Type unknown.

Note. In Elfstrand's (l. c.) diagnosis, the following is said regarding the glanduliferousness of the involu-
 cral bracts: “...mit einzelnen vereinzelt Drüsenhaaren bekleidet”; however, on the specimen identified by him and collected by R. Pohle on 9 August 1911 from the Khibiny Mountains, the glands are numerous.

198. **H. subimandrae** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 482.—*H. fuliginosum* Laest. var. *imandrae* Norrl. Hier. exs. fasc. IX (1908) No. 46.

Perennial. Stem 22–37 cm high, 1.0–2.5 mm in diameter, with occasional hairs, and scattered glands throughout, stellate-hairy. Basal leaves 6(3–8), obovate, spatulate to lanceolate, abruptly or gradually
177 narrowed to petiole, obtuse or acute, with broad and fine-triangular or sharply serrate teeth (3–9), light green, to 15 cm long (6:1), with scattered pubescence on both sides, along margin occasionally glandular; cauline leaves (1–)2 (coefficient of leafiness 0.06), lanceolate, bottom leaf distinctly sharply serrate, petiolate, upper sessile, more or less entire, along margin with stellate hairs and tiny glands. Inflorescence lax, strongly dichotomous, with (1–)2–6 capitula; peduncles with occasional hairs and scattered glands 0.5 mm long, more or less tomentose. Involucres 11.5(10–12) mm long; involucre bracts narrow, acute, with hairs 2 mm long, to moderately (50) pubescent and with dense glands (80) 0.2–0.8 mm long, without stellate hairs, at tip barbate. Ligule teeth more or less eciliate; stigmas dark. Flowering July to September.

Sandy stream banks in tundra and birch forests.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region (Imandra). Type in Leningrad.

Note: Norrlin treated this plant as a variety (var. *imandrae* Norrl.) of *H. fuliginosum* Laest. However, in light of the significant deviation from the type in important characters as for example, the low coefficient of leafiness, moderate pubescence of the involucre (very dense on the type), almost complete absence of cilia on the teeth of the ligules, and scattered pubescence of the leaves, we consider it necessary to elevate Norrlin's variety to the rank of species.

199. **H. pergrandidens** Zehn in Pflzr. IV, 280 (1921) 670.—*H. grandidens* Elfstr. Arch. Norw.-Finnm. (1894) 27, non Zahn.—*H. bathycephalum* Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 215, vix Dahlst.

Perennial. Stem up to 35 cm high, 2.5–3.0 mm in diameter, yellowish-green, scattered-pubescent, with occasional glands above. Basal leaves 5–6, oval or broadly lanceolate, to 11 cm long (4:1), with base abruptly or gradually narrowed to petiole, with coarsely or roughly triangular or falcate teeth, acute, in general densely pubescent (hairs 0.6–1.0 mm long) on both sides, with tiny glands along margin; cauline leaves 1–2 (coefficient of leafiness 0.04), small, bottom leaf deeply sharp-toothed, upper lanceolate, entire. Inflorescence dichotomous, with 2 capitula; peduncles weakly pubescent, hairs 1.5 mm long and glandular, glands 0.6 mm long, scatteredly tomentose. Involucres 13.5 mm long; involucre bracts narrow, tapered, moderately (57–61) pubescent,

hairs 1.5 mm long, densely, glandular 90(77–115), glands 0.4–0.2 mm long, almost without stellate hairs. Stigmas yellowish brown. Flowering July to September.

Alpine tundra zone, in elfin birch woodlands—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from Norway (Finmarken). Type in Stockholm.

- 178 200. **H. kuroksarens** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 483.

Perennial. Stem 23 cm high, 1 mm in diameter, weakly pubescent, finely glandular above and somewhat stellate-hairy. Basal leaves 6, elliptical-lanceolate, narrowed to petiole, more or less entire, moderately pubescent above, weakly, scatteredly pubescent beneath, with occasional tiny glands along margins and petioles; cauline leaves 1–2 (coefficient of leafiness 0.06), lanceolate, sessile. Inflorescence strongly dichotomous, with 2 capitula; peduncles with scattered (prominent) pubescence, hairs 1.5 mm long, similarly finely glandular, glands 0.4 mm long, tomentose. Involucres 11 mm long; involucral bracts narrow, acute, to moderately, 52(44–60), pilose, hairs 2.5 mm long, scattered-glandular, 40(36–44), glands 0.5 mm long, without stellate hairs. Ligule teeth ciliate; stigmas dark. Flowering July.

Mountains.—*European Part*: Volga-Kama (Urals). Endemic. Described from Central Urals. Type in Leningrad.

Note. Our species is close to *H. pseudobipes* Elfstr. but is distinguished by the entire margin and dark stigmas. On the label of the type specimen, P.N. Krylov made the following remark: "Intermediate forms (hybrids?) between *H. vulgatum* and *H. alpinum*," which is testimony to his understanding.

201. **H. pseudobipes** Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 214, 220; Zahn in Pflzr. IV, 280, 671 (nota).

Perennial. Stem 25–40 cm high, flexuous or almost straight, green, 1.5–2.5 mm in diameter, to scatteredly short-pubescent, in upper part with occasional glands and stellate hairs. Basal leaves 3–6, outer broadly ovate-lanceolate, inner ovate-lanceolate (4.5:1), acute, with truncate or cuneately elongate base, entire toward tip, irregularly denticulate, grayish-green above, lighter beneath, on both sides and along margin densely (hairs 0.7–1.5 mm long) pubescent and with few tiny glands; cauline leaves mostly 1 (coefficient of leafiness 0.03), narrowly linear-lanceolate, very acute, glabrous above, pubescent beneath. Inflorescence open-dichotomous panicle comprising 1–3 capitula; peduncles occasionally to scatteredly pubescent, hairs 0.5 mm long, glandular, tomentose. Involucres 11–13 mm long, turbinate;

involucral bracts blackish-green, somewhat broad to narrow, mostly more or less obtuse, moderately, 55(45–60), hairy, hairs 1.5 mm long and similarly, 58(46–74), with glands 0.2–0.4 mm long, without stellate hairs, but at tip barbate. Stigmas yellowish-brown, later turning dark. Flowering July to August.

Tundra.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region (Monche-tundra). Type in Leningrad.

202. **H. senescentifrons** Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 216, 220; Zahn in Pflzr. IV, 280, 683 (nota).

179 Perennial. Stem 15–45 cm high, 1.5–2.5 mm in diameter, with occasional hairs 1–2 mm long and glands, somewhat stellate-hairy. Basal leaves 4(3–7), outer oval, elliptical or oblong-obovate, inner narrowly oblong-lanceolate, to 16 cm long (6:1), gradually narrowed to long petiole, in upper half entire, toward base with remote, fine, sharp (spinose) teeth, sometimes with 1–2 longer teeth, thinly hairy at base of lamina with hairs 1 mm long, with small glands along margin; cauline leaves 1–2 (coefficient of leafiness 0.05), narrowly lanceolate (upper leaf linear) sparsely stellate-hairy beneath along midrib. Inflorescence loosely dichotomous, with 2–3 capitula; peduncles more or less glabrous, sparsely to scatteredly glandular with glands 0.5–1.0 mm long, with scattered stellate hairs. Involucres 10.5–13 mm long; involucral bracts black-green, linear, mostly more or less obtuse (only inner bracts sometimes subulate), with occasional to sparse, 12(7–21), dark hairs 1.0–1.5 mm long and very dense, 106(83–144), yellowish-brown glands (long ones 1 mm long and small ones 0.1 mm long, yellow), without stellate hairs. Stigmas dark (brown). Flowering July to August.

Elfin birch woodlands, on moraines.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region (Khibiny Mountains). Type in Leningrad.

Cycle 7. Nigrescentiformia Juxip.—Inflorescence of 1–4 capitula; coefficient of leafiness medium (0.07–0.13).

203. **H. lujaurens** Norrl. Nya nord. Hier. II (1912) 102; Zahn in Pflzr. IV, 280, 659 (nota).—*Exs.*: Norrl. Hier. exs. fasc. VII, No. 35.

Perennial. Stem 20–30 cm high, 1.5–2.0 mm in diameter, stramineous, dark above, very sparsely hairy with hairs 2.5–3.0 mm long, with scattered glands (more prominent in upper third), 0.3–0.5 mm long. Basal leaves 3–12, lanceolate, narrowed to long petiole, to 16 cm long (6:1), with 2–3 remote, triangular teeth to 5 mm long, wavy, plicate, acute, covered on both sides with scattered hairs 2.0–2.5 mm long, with occasional tiny glands along margin; cauline leaves 3(2–4) (coefficient

of leafiness 0.12), lanceolate, acute, bottom leaf petiolate, others with elongated base, sessile. Inflorescence loosely dichotomously paniculate, of 3(1–4) capitula; peduncles with few hairs, to moderately and coarsely glandular, glands 1 mm long. Involucres 12–15 mm long; involucre bracts densely, 93(85–110), pubescent, hairs 2.5 mm long, densely 125(118–132), glandular, glands 0.1–0.3 mm long, somewhat, barbate, without stellate hairs. Ligule teeth eciliate; stigmas dark. Flowering August.

- 180 Sandy cliffs of rivers and lakes, stony-gravelly talus in subalpine and alpine zones.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region (Lovozero Lake). Type in Helsinki; paratype in Leningrad.

204. **H. soczavae** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 483.

Perennial. Stem 24–28 cm high, 1.5–2.0 mm in diameter, pale green, with scattered, short pubescence, scattered glands (particularly prominent in upper third), 0.2–0.5 mm long. Basal leaves 4–8, obovate, abruptly narrowed to petiole, with gradual transition to lanceolate, long-petiolate leaves, in lower half finely crenate with 4–5 teeth, in upper half entire, obtuse to somewhat acute, moderately pubescent on both sides, along margin weakly glandular; cauline leaves 2 (coefficient of leafiness 0.8), lanceolate, weakly toothed. Inflorescence with 1(–2) capitula; peduncles sparsely pubescent and scatteredly glandular, tomentose. Involucres 14–15 mm long, ovate; involucre bracts densely (80) pubescent, hairs 2.5 mm long and densely (100) glandular, glands 0.1–0.3 mm long, tips barbate, without stellate hairs. Ligule teeth ciliate; stigmas black. Flowering August (Plate XI, Fig. 2.)

Alpine meadow patches in mountains.—*Western Siberia*: Arctic Siberia. Endemic. Described from Northern Urals, basin of Severnaya Sosva River, upper reaches of Khulga River. Type in Leningrad.

Note: It is distinguished from the related species *H. lujaurens* Norrl. by leaves that are denticulate in the lower half and entire in the upper half; it replaces *M. lujaurens* in the Northern Urals, found in the Kola Peninsula.

205. **H. vaidae** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 484.

Perennial. Stem 23–26 cm high, 1.5 mm in diameter, flexuous, almost without hairs, with occasional glands below inflorescence and scattered stellate hairs. Basal leaves 4–6, outer oval, obtuse, entire, others lanceolate, acute and scarcely denticulate, to 6 cm long (4:1), narrowed

to long petiole, densely populated (hairs 0.7 mm long) above, along margin and beneath moderately hairy (2–1 mm long hairs), as a whole densely pubescent (unusual for species of the section), with occasional tiny glands along margin; cauline leaves 2–3 (coefficient of leafiness 0.10), lanceolate, upper linear, small, stellate hairy beneath along midrib. Inflorescence paniculate, with 3 capitula; peduncles with occasional hairs and very few (0.5 mm long) glands, tomentose. Involucres 10 mm long; involucre bracts densely (70, 2.5 mm long) pubescent, densely (80) finely glandular, glands 0.2 mm long, without stellate hairs. Ligule teeth ciliate; stigmas black. Flowering July.

181 Tundra.—*European Part*: Arctic Siberia. Endemic. Described from Murmansk Region (Vaidaguba). Type in Leningrad.

Note. Related to *H. pseudobipes* Elfstr., it can be distinguished by the number of cauline leaves (2–3), smaller involucres (10 mm long), and black stigmas.

206. **H. decurrens** Norrl. Nya nord. Hier. II (1912) 115; Norrl. in Mela-Cajander, Suom. Kasvio, 680; Zahn in Pflzr, IV, 280, 1551 (nota).—**Exs.**: Norrl. Hier. exs. fasc. VII, No. 49.

Perennial. Stem 20–40 cm high, 1–3 mm in diameter, stramineous, with scattered pubescence and more or less eglandular. Basal leaves to 6, rounded to ovate-lanceolate, to 14 cm long, (4:1), with 3–5 unequal small teeth, weakly hairy on both sides with scattered hairs, hairs 0.5–1.0 mm long, with occasional glands along margin, weakly stellate-hairy, grayish-green; cauline leaves 2(1–3) (coefficient of leafiness 0.07), lanceolate, much smaller than basal leaves, on both sides stellate hairy, but more densely beneath. Inflorescence strongly dichotomous, with (1–)2–3 capitula; peduncles sparsely pubescent and glandular, tomentose. Involucres 10–13(–15) mm long; involucre bracts somewhat narrow, acute, to densely (60–70) pubescent with hairs 2.5 mm long and equally densely (60–75) glandular, glands 0.3 mm long, without stellate hairs, tips barbate. Ligule teeth eciliate; stigmas dark. Flowering July to September.

Tundra on mountain slopes.—*European Part*: Arctic Europe, Karelia-Lapland. Endemic. Described from Murmansk Region (Voroninsk). Type in Helsinki; paratype in Leningrad.

207. **H. stenopiforme** Pohle and Zahn in Allgem. Bot. Zeitschr. (1907) 111, Elfstr. in Sv. Bot. Tidskr. VIII, 2, 208; Zahn in Pflzr. IV, 280, 655.

Perennial. Stem 10–30 cm high, 1–2 mm in diameter, flexuous, sparsely to moderately pilose, weakly glandular and stellate-hairy. Basal leaves 4–10(–15), outer lanceolate-spatulate, subobtusate, inner lanceolate

to narrow (up to 12 cm long) (4.7:1), acute, finely or unequally crenate, (with teeth running down to petioles), light green, moderately hairy with hairs 2 mm long, along margin occasionally glandular and stellate-hairy; cauline leaves (1–2)2–4 (coefficient of leafiness 0.13), narrowly lanceolate, toothed, to linear. Inflorescence dichotomous, with 1–4 capitula; peduncles with scattered hairs, densely glandular. Involucres (9–)12–14 mm long, truncate involucre bracts narrow, acute to subulate, to quite densely (76) hairy, hairs 2 mm long, moderately (60) finely glandular, glands 0.1 mm long, without stellate hairs. Ligule teeth weakly ciliate; stigmas yellowish brown, later turning dark. Flowering July to August.

- 182 Dwarf arctic birch tundra of subalpine zone in mountains.—*European Part*: Arctic Europe (Urals); *Western Siberia*: Arctic Siberia (Urals). Endemic. Described from Northern Urals. Type in Leningrad.

208. **H. stenomischum** Omang in *Nyt. Mag. Nat. L.* (1912) 165; Elfstr. in *Sv. Bot. Tidskr.* VIII, 2, 211; Zahn in *Pflzr.* IV, 280, 662; Samuelsson, *Maps of Scand. Hier. sp. No.* 18.

Perennial. Stem 15–40 cm high, 1.5–3.0 mm in diameter, at base violet, with scattered hairs 2 mm long, equally scattered-glandular, stellate-hairy above. Basal leaves 3–6, oval, abruptly narrowed, obtuse to spatulate and lanceolate, gradually narrowed to long, slender, petiole, acute, to 13 cm long (under cultivation to 18 cm) (4.5:1), with 4–6 small teeth, glabrous above but scattered-pubescent beneath, with occasional tiny glands along margin; cauline leaves 1–2(–4) (coefficient of leafiness 0.07), lanceolate, tapered toward base, acute, denticulate with 5–8 teeth, stellate-hairy beneath along midrib. Inflorescence loosely and dichotomously (one-sided) paniculate with 3–4 capitula, lower branches often long; peduncles weakly pubescent and scattered-glandular, scatteredly tomentose. Involucres 14–16 mm long (in var. *vultum* Elfstr.—11–12 mm long); involucre bracts somewhat narrow, obtuse to more or less acute, moderately, 55(49–62), hairy, hairs 2 mm long, densely, 100(85–114), glandular, glands 0.3 mm long, without stellate hairs. Florets tubular; ligule teeth weakly ciliate; stigmas dark (often yellow). Flowering March.

Subalpine and alpine tundra zones.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from Norway. Type in Oslo.

Note. We give here the description of the species, although so far only the variety (var. *vultum* Elfstr.) has been found in our country. According to Samuelsson, this species grows exclusively in southern Norway (endemic).



209. **H. tanense** Elfstr. Arch. Norw. Finnm. (1894) 14; Zahn in Pflzr. IV, 280, 662.

Perennial. Stem 15–40 cm high, 1.5 mm in diameter, covered with scattered (more dense above) hairs 1.5 mm long, with occasional glands above, tomentose. Basal leaves 2–7 at anthesis, rounded-elliptical, obtuse, gradually becoming (narrowly) lanceolate and acute, narrowed to long petiole, more or less entire or with small acute teeth, grass-green, with weak and short (0.5–1.0 mm long), scattered pubescence on both sides and along margin, with occasional glands along margin; 185 cauline leaves 2–3 (coefficient of leafiness 0.10), narrowly lanceolate (6–7:1) to linear, for the most part only bottom leaf develops, others bracteiform, entire, acute, with occasional stellate hairs beneath. Inflorescence strongly dichotomous or paniculate, with (1–)2–3 capitula; peduncles with scattered hairs 3 mm long and with few glands 0.5 mm long, scatteredly tomentose. Involucres 13–16 mm long; involucre bracts narrow, linear, dark, acute, inner subulate, with few dark hairs 2 mm long, to moderately pubescent and with similar number of glands, 0.3–0.5 mm long, without stellate hairs. Florets partly tubular; ligule teeth weakly ciliate; stigmas black. Flowering July to August.

Tundra, on mountain slopes.—*European Part*: Arctic Europe (Kildin Island); *Western Siberia*: Arctic Siberia (basin of Lyapina River). *General distribution*: Scandinavia. Described from Norway. Type in Stockholm?

Note: The description is based on Elfstrand's diagnosis; we were unable to see the authentic specimen. Our Siberian plant deviates somewhat from the type and possibly represents a separate species.

Cycle 8. Fuliginosa Juxip.—Inflorescence with 1–6 capitula; coefficient of leafiness high (0.14–0.20).

210. **H. fuliginosum** Laest. in Sv. Vet.-Ak. Handl. (1826) 169; non al., Norrl. in Mela-Cajander, Suom. Kasvio. 679; Nya nord. Hier. II, 108; Zahn in Pflzr. IV, 280, 658.—*Exs.*: Norrl. Hier. exs. fasc. VII, Nos. 31–34, IX, No. 46.

Perennial. Stem 15–30 cm high, 1.5 mm in diameter, dark above, moderately covered with hairs 3–5 mm long, throughout weakly glandular, glands 0.3 mm long. Basal leaves 6(5–7), lanceolate, gradually narrowed to very long petiole, with 1–3 prominent teeth, densely hairy above, moderately beneath along margin, with hairs 2.0–2.5 mm long, with scattered small glands along margin; cauline leaves (1–)2–5 (coefficient of leafiness 0.14), lanceolate to ligulate, with toothed margin, densely pubescent and somewhat stellate-hairy beneath. Inflorescence dichotomous, with 1(–2) capitula; peduncles with occasional hairs, to

scatteredly glandular and tomentose. Involucres 12–15 mm long; involucre bracts somewhat narrow, acute, blackish-green very densely, 145(140–150), hairy, hairs 2–3 mm long, to moderately, 46(34–68), glandular, glands 0.1–0.3 mm long, without stellate hairs. Ligule teeth ciliate; stigmas dark. Flowering August. (Plate XXI, Fig. 2.)

On slopes in tundra—*European Part*: Arctic Europe. *General distribution*: Scandinavia (Lapland). Described from Scandinavia. Type in Stockholm?

Note. We also tentatively include *H. alienatum* Norrl. (Nya nord. Hier. II, 83) here, which was described from the Murmansk Region (Zahn in *Pflzr.* IV, 280, 658).

- 186 211. **H. gorodkowanum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 484.

Perennial. Stem 15–25 cm high, 1.5–2.0 mm in diameter (sometimes to 3 stems from a single rhizome), more or less glabrous or moderately covered with hairs 3 mm long (var. *serratodenticulatum* Juxip), with few tiny glands throughout. Basal leaves 4(0–8), outer obovate, rounded obtuse, subentire, inner lanceolate, mostly narrowed toward base to broad, winged petiole, entire or with 5–9 small, acute, serrate teeth (var. *serratodenticulatum* Juxip), plicate at tip, spinescent, quite sparsely covered with hairs 2–3 mm long, with occasional tiny glands and few stellate hairs along margin; cauline leaves 6(3–10) (coefficient of leafiness 0.25), lanceolate, acute, more or less entire, glabrous or weakly pubescent, upper 2–3 leaves crowded below inflorescence and partly transitional involucral bracts. Inflorescence loosely (dichotomously) paniculate with (1–)2(–4) capitula on axillary branches; peduncles with sparse hairs 1.5–3.0 mm long and scattered-glandular, glands 0.2–0.5 mm long, scatteredly tomentose. Involucres 14.0–14.5 mm long, ovate, later truncate; involucre bracts somewhat broad, acute, with dense, 95(70–125), hairs 3–5 mm long and with dense, 70(50–95), tiny glands 0.1–0.3 mm long, without stellate hairs. Ligule teeth ciliate; stigmas dark; achenes 4 mm long. Flowering June to September. (Plate XXI, Fig. 1.)

On riverbank gravels.—*Western Siberia*: Arctic Siberia. Endemic. Described from basin of Sob River. Type in Leningrad.

Note. The variety is established from the basin of the Severnaya Sosva River and Manya River.

A species close to *H. fuliginosum* Laest., which differs from it mainly by having a coefficient of leafiness twice as high (0.25 against 0.10), and also the upper leaves are crowded below the inflorescence, and partly transitional to the foliaceous involucral bracts.

212. **H. polymorphophyllum** Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 205, 218; Zahn in Pflzr. IV, 280, 663 (nota).

Perennial. Stem 10–40 cm high, 1.0–2.5 mm in diameter (often 2–3 stems from a single rhizome), entirely covered with scattered hairs 1.5–2.5 mm long and glands 0.3–0.4 mm long, stellate-hairy. Basal leaves 5(1–10), of different forms and sizes, from small to quite long (to 13 cm long), outer leaves elliptical, spatulate to lanceolate, narrowed to long petiole, obtuse, inner narrowly lanceolate (7:1) or linear-lanceolate, acute, weakly denticulate, weakly, scatteredly pubescent (at first glance glabrous) on both surfaces, with hairs 1–2 mm long, with occasional tiny glands along margin, somewhat stellate-hairy along midrib beneath; cauline leaves 2–4(–6) (coefficient of leafiness 0.16), quite small, narrowly lanceolate to linear (except bottom one, leaves bracteiform), entire, stellate-hairy beneath and distinctly fine-glandular. Inflorescence with 1(–2) capitula (rarely to 5); peduncles more or less glabrous, sparsely glandular, scatteredly tomentose. Involucres 11–14 mm long, ovate, later truncate; involucre bracts narrow, linear, somewhat obtuse to acute, moderately, 57(40–80), hairy with hairs 1.0–2.5 mm long, very densely, 130(95–150), glandular with glands 0.2–0.4 mm long, without stellate hairs, barbate. Florets partly tubular, ligules ciliate; stigmas blackish. Flowering July to August.

Sandy slopes, spruce forests, mountain meadow patches, thin larch forests.—*European Part*: Arctic Europe; *Western Siberia*. Described from Kolguev Island. Type in Leningrad.

213. **H. finmarkicum** Elfstr. Arch. Norw. Finn. (1894) 13; Elfstr. in Sv. Bot. Tidskr. VIII, 2, 210; Zahn in Pflzr. IV, 280, 663.

Perennial. Stem up to 25 cm high, flexuous, mostly branching from base of axils of cauline leaves, pubescent, glandular, stellate-hairy, often several stems from a single rhizome. Basal leaves 3–5 at anthesis, oblong to narrowly lanceolate, toward base with few distinct, somewhat acute teeth, narrowed to average-length petiole, short-pubescent, with tiny glands along margin; cauline leaves 3–4 (coefficient of leafiness 0.14), bottom leaf quite well developed, narrowly lanceolate, (almost) entire, others abruptly reduced, small, linear or almost filiform, upper leaf bracteiform, stellate-hairy beneath. Inflorescence dichotomous, with 1–4 capitula (branches uncapitulate). Involucres 9(–12) mm long; involucre bracts narrow, linear, mostly acute (outer subobtuse), moderately (to densely) pilose with fine hairs, to moderately fine-glandular, without stellate hairs. Florets tubular, but sometimes ligulate. Ligule teeth densely ciliate; stigmas dark. Flowering August to September.

Dry sandy bluffs.—*European Part*: Arctic Europe (Kolguev Island; Vostochanaya Litsa). *General distribution*: Scandinavia (Arctic). Described from Norway. Type in Stockholm?

Subsection 3. Atrata (Fr.) Juxip.—*H. atratum* Fr. in Zahn in Pflzr. IV, 280 (1921) 669; in Asch. and Graebn. Synopsis, XII, III, 177. —*Alpina nigrescentia* Elfstr. Hier. Alp. (1893) 41 p. p.; Norrl. in Mela-Cajander, Suom. Kasvio, 680 p. p.; Dahlst. in Lindm. Svensk Fan.-Fl. 2, ed. 598 p. p.—Inflorescence on average with 4[(1-)2-12] capitula, strongly dichotomous or more often loosely paniculate; cauline leaves 1-2(-3); leaves (inner basal and lower cauline) usually abruptly narrowed to winged petiole, or base of lamina truncate to more or less
188 cordate, often coarsely toothed at base, with scattered tiny glands; along margin and on petioles; beside tiny glands somewhat large glands also present on involucre bracts; stellate pubescence of plant parts often conspicuous; stigmas dark; achenes black.

Cycle 9. Atrata Juxip.—Inflorescence with 4(2-12) capitula; coefficient of leafiness low, 0.03-0.06.

214. *H. ovaliceps* Norrl. in Acta Soc. Fa. et Fl. Fenn. III, 4 (1888) 82; Dahlst. in Acta horti Berg. II, 4, 107; Zahn in Pflzr. IV, 280, 672; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 612.—*Exs.*: Norrl. Hier. exs. Nos. 92, 92b; Dahlst. Hier. Scand. fasc. III, No. 38, V, Nos. 10, 11, XII, No. 8, XVIII, No. 89.

Perennial. Stem 30-50 cm high, flexuous, scattered-pubescent, occasionally glandular and stellate-hairy above. Basal leaves numerous, broadly ovate, rounded-obtuse or oblong-ovate, inner narrowly ovate-lanceolate, abruptly and gradually narrowed toward base, all leaves with more or less dense and long; partly subulate toothed or lobate, often with free teeth at base making base sagittate; more or less to dense-pubescent; cauline leaves 1-3 (coefficient of leafiness 0.05), lanceolate, at base deeply and subulately incised. Inflorescence strongly dichotomously paniculate, with (1-)2-5(-10) capitula; peduncles glabrous or somewhat pilose, densely glandular, tomentose. Involucres 12-16 mm long; involucre bracts lanceolate, somewhat obtuse, black, from quite broad base narrowed to quite long cusp, densely pubescent, as well as glandular, distinctly stellate-hairy (hairs crowded mainly along margin). Florets sometimes partly tubular; stigmas dark. Flowering July to August.

Birch and coniferous forests.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from Sweden. Type in Helsinki?

215. **H. barbulatum** Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 112; Elfstr. in Sv. Bot. Tidskr. VIII, 2, 217; Zahn in Pflzr. IV, 280, 674.

Perennial. Stem 25–45 cm high, 2–4 mm in diameter, sulcate, scattered-pubescent, with occasional glands above. Basal leaves 3–5, elliptical or oblong-lanceolate, abruptly or gradually (inner leaves) narrowed to long white-pilose petiole, subobtuse or subacute, with fine, or toward base (3–5) broad, triangular or curved, acute teeth, pubescence of leaves in general scattered (glabrous above), along margin with occasional tiny glands; cauline leaves 1(–3) (coefficient of leafiness 0.05), mostly small. Inflorescence strongly dichotomously paniculate, of 2–5 capitula; peduncles sparsely hairy with hairs 1.0–2.5 mm long, with scattered glands 0.6 mm long, sparsely tomentose. Involucres 189 (10–)11–13 mm long; involucral bracts narrow, acute, densely, 87(70–100), light-hairy, hairs 2–3 mm long, with scattered, 42(35–55), glands 0.3–0.6 mm long, almost without stellate hairs, barbate at tip. Stigmas dark. Flowering July to August.

Pine, herb-spruce, and larch forests.—*European Part*: Karelia-Lapland, Dvina-Pechora. Endemic. Described from banks of Usa River (tributary of Pechora River). Type in Leningrad.

216. **H. nigrescens** Willd. Sp. pl. III (1800) 1574; Zahn in Pflzr. IV, 280, 664; Elfstr. Hier. Alp. 67.—*H. eu-nigrescens* Zahn in Asch. and Graebn. Synopsis, XII, III (1936) 174.—*lc.*: Willd. (l. c.) t. X.

Perennial. Stem 15–35 cm high, 1.5 mm in diameter, weakly flexuous, with scattered hairs 1–2 mm long, and equally glandular throughout, glands 0.1–0.5 mm long (sometimes 2 stems from single rhizome). Basal leaves 4(2–7), ovate-lanceolate, often quite large (to 15 cm long), narrowed to petiole, coarsely and irregularly crenate (particularly toward base of lamina), on both sides with scattered short hairs 1 mm long, with occasional tiny glands along margin; cauline leaves 1–2 (–3) (coefficient of leafiness 0.06), bottom leaf very well developed, lanceolate, petiolate, deeply toothed, others usually bracteiform. Inflorescence dichotomously paniculate, of (1–)2–5(–10) capitula; peduncles more or less glabrous or with occasional scattered glands 0.3–0.6 mm long, scatteredly stellate-hairy. Involucres 12–16 mm long, ovate; involucral bracts somewhat broad, more or less obtuse, inner bracts acuminate, with scattered (34) hairs 2 mm long, very densely (112) glandular, glands 0.2–0.6 mm long, without stellate hairs. Stigmas dark. Flowering July to August.

Subalpine and alpine meadow patches to 2000 m.—*European Part*: Upper Dniester (Carpathians). *General distribution*: Central Europe. Described from Sudeten?). Type in Berlin?

217. **H. atrellum** Zahn, Hier. Europ. (1914) No. 860 and Sched. IX, 16; in Pflzr. IV, 280, 677.—*H. atratum* auct. fl. Germ. et Austr.—**Exs.:** Callier, Fl. Siles, exs. No. 1129; Zahn, Hier. Europ. Nos. 663, 860.

Perennial. Stem 15–35 cm high, 2 mm in diameter, pubescence scattered, scattered-glandular and very scatteredly stellate-hairy above. Basal leaves to 8, outer oval-elliptical, truncate or abruptly narrowed to petiole, obtuse, others oblong to oblong-lanceolate, gradually narrowed to long petiole, acute, small or large (3:1), along margin finely or coarsely (at base) toothed, sometimes with free teeth, dark green
 190 above, pale green beneath, often colored, pubescence in general to dense, with hairs 1.0–1.5 mm long on both sides and with tiny glands along margin; cauline leaves 1 (rarely 2) (coefficient of leafiness 0.04), lanceolate, entire or sharply toothed. Inflorescence strongly dichotomous, with 1–4(–8) capitula; peduncles with occasional hairs 1.5 mm long and up to moderate glands 0.5 mm long, tomentose. Involucres 10–13 mm long, thick; involucre bracts broadly lanceolate with narrowed tip, black, somewhat obtuse, inner bracts narrower and acuminate, with light-colored margin, with scattered (36) gray hairs 2.5 mm long and very densely (184) glandular with glands 0.4–0.1 mm long, with scattered stellate hairs. Florets golden-yellow; ligule teeth somewhat ciliate; stigmas dark. Flowering July to August.

Mountains from elfin woodlands to alpine zone, 1200–2200 m.—*European Part.* Upper Dniester (Carpathians). *General distribution:* Central Europe. Described from Sudeten. Type unknown.

218. **H. semicurvatum** Norrl. Hier. exs. fasc. (1906) Nos. 50–53; Nyman, Hier. II, 117; Zahn in Pflzr. IV, 280, 675; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 611.—*H. semicurvescens* Norrl. in Mela-Cajander, Suom. Kasvio (1906) 681; Samuelsson, Maps of Scand. Hier. sp. No. 21.—**Exs.:** Norrl. Hier. exs. f. VII, Nos. 50–53; Dahlst. Hier. Sc. f. XXV, Nos. 35–38.

Perennial. Stem 25–40 cm high, 1–2 mm in diameter, with scattered short pubescence (1.0–1.5 mm long), with occasional glands above, and somewhat stellate-hairy, yellowish-green. Basal leaves 4–5(3–7), small, to 7 cm long, rounded-cordate or more or less broadly ovate (3:1), with truncate or semicordate base or abruptly narrowed to conspicuous petiole, obtuse or short acuminate-spinescent, with 3–5 broadly triangular small teeth, grayish-green and glabrous or with scattered hairs above, bluish or violet and with scattered hairs beneath and along margin, with dense hairs 0.5–1.5 mm long along midrib, as a whole moderately pubescent; cauline leaves 1–2 (coefficient of leafiness 0.04), lanceolate, upper leaf bracteiform. Inflorescence dichotomous or paniculate, with 2–5 capitula; peduncles with sparse short hairs (1 mm

long) and sparsely glandular, glands 0.4 mm long, tomentose. Involucres 10–12(–13) mm long, thick; involucral bracts broadly lanceolate, acuminate, blackish, with scattered (30–40), hairs 1.5 mm long and dense, 80(50–110), glands 0.3–0.1 mm long, without stellate hairs. Ligule teeth eciliate; stigmas dark. Flowering July to August.

Stream banks.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from Finnish Lapland. Type in Helsinki; paratype in Leningrad.

Note. According to Samuelsson (op. cit.), it is found only in the western part of the Rybachy Peninsula.

219. *H. scotaiolepis* Elfstr. in Sv. Bot. Tidskr. VIII, 2 (1914) 215, 220; Zahn in Pflzr. IV, 280, 683.—*H. atratulum* Norrl. in Herb. Mus. 191 Finn. ed. 2 (1889) 152; in Mala-Cajander, Suom Kasvio, 681 p. p.; Zahn in Pflzr. IV, 280, 684 (nota).—*Exs.*: Norrl. Hier. exs. fasc. VII, No. 55 (sub *H. atratulum* Norrl.).

Perennial. Stem 35–55 cm high, 2–3 mm in diameter, with occasional hairs 1.5–2.5 mm long, with few glands 0.4–0.6 mm long and somewhat stellate-hairy above. Basal leaves 4(2–8), outer elliptical, obtuse, inner lanceolate, to 19 cm long (4:1), abruptly or gradually narrowed to petiole, acute, with 3–9 small, more or less spinose teeth or almost entire, without or with occasional hairs above near margin, pubescence beneath and along midrib dense, along margin moderate, as a whole moderate, hairs 1 mm long, with occasional tiny glands along margin; cauline leaves 1–2 (coefficient of leafiness 0.03); lanceolate or linear, entire or with very small teeth, slightly stellate-hairy beneath. Inflorescence openly dichotomously paniculate with 3–4 capitula; peduncles with occasional hairs 1 mm long and moderate glands 0.5–0.7 mm long, tomentose. Involucres 10.0–11.5 mm long; involucral bracts blackish-green, with violet tip, somewhat broad, inner narrow and acute, to sparsely, 10(5–18), pubescent with hairs 1.0–1.5 mm long, to very densely, 120(75–160), glandular, glands 0.7–1.0 mm long, without stellate hairs. Ligule teeth scarcely ciliate; Stigmas yellowish brown. Flowering July to August.

Humid birch forests, meadows along stream banks.—*European Part*: Karelia-Lapland. Endemic. Described from Murmansk Region (Khibiny Mountains). Type in Leningrad.

220. *H. subnigrescens* Fr. Hier. Europ. (1862) No. 91 p. p.; nec Simk. (1881): Norrl. in Acta Soc. Fa. et Fl. Finn. III, 4, 81; Dahlst. in Acta horti Berg. II, 4, 121; Zahn in Pflzr. IV, 280, 681.—*H. eu-subnigrescens* Zahn in Asch. and Graebn. Synopsis, XII, III (1936)

182.—**Exs.:** Dahlst. Herb. Hier. Scand. fasc. III, No. 44; Baenitz, Herb. Europe. No. 516.

Perennial. Stem (10)20–50 cm high. Basal leaves broadly or oblong-ovate, somewhat obtuse, often quite large, inner oblong-lanceolate, abruptly or gradually narrowed to petiole, short-toothed but at base with crenate, obtuse, triangular teeth, sometimes alternating with broad or narrow, more or less coarse teeth, less often with free teeth on petioles, to densely short-pubescent; cauline leaves 1–2 (coefficient of leafiness 0.05), ovate-lanceolate, irregularly many-toothed, upper leaf often reduced. Inflorescence openly dichotomously paniculate (sometimes to half the length of stem) with (1–)3–6(–12) capitula; peduncles more or less without hairs, but with numerous large black glands, weakly tomentose. Involucres 13–15 mm or 10–13 mm long (f. b. *minoriceps* Zahn), thick; involucral bracts clearly narrowed from broad base toward obtuse or acute tip, blackish, with sparse (or few) hairs, with large, dense glands, without stellate hairs. Florets partly tubular; stigmas black. Flowering July to August.

Mountains, at 1100–1500 m.—*European Part:* Upper Dniester (Carpathian Mountains). *General distribution:* Scandinavia, Central Europe, Atlantic Europe. Described from Scandinavia (Dovre [fjell?]). Type in Uppsala.

221. **H. orthopodum** Dahlst. in Acta horti Berg. II, 4 (1894) 117; Zahn in Pflzr. IV, 280, 680; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 610.—*H. pseudonigrescens* Almqu. in Dahlst. Hier. Scand. exs. III (1889) No. 22; Elfstr. in Bot. utfl. 53; Dahlst. Hier. Scand. exs. III, Nos. 40, 41.—*H. atratum* Elfstr. Hier. Alp. (1893) 47 and Arch. Norw.-Finnm. (1894) 26; nec Fr.—**Exs.:** Dahlst. Hier. Scand. exs. III, Nos. 40–42, XVIII, No. 97, XX, Nos. 52, 53, XXIII, No. 33.

Perennial. Stem 25–60 cm high, slender, more or less glabrous, with tiny glands above, stellate-hairy throughout. Basal leaves 2–8, outer rounded or broad-elliptical, inner broadly or narrowly ovate-lanceolate or somewhat rhomboid, with truncate or abruptly narrowed base, mostly acute, with triangular teeth (2–4) in lower half, finely toothed (teeth partly narrow and acute, partly broad and somewhat obtuse, straight or curved) in upper half, pale gray more or less sparsely to scatteredly pubescent beneath (almost glabrous above), midrib very prominent; cauline leaves 1–2(–3) (coefficient of leafiness 0.05), ovate-lanceolate, narrow. Inflorescence dichotomously paniculate (open), of 2–4(–6) capitula, branches erect, long; peduncles glabrous (or with occasional hairs), sparsely glandular, with scattered stellate pubescence. Involucres 12–14 mm long; involucral bracts narrow, linear, somewhat obtuse to subulate, blackish-green, glabrous or with occasional gray hairs,

densely, 83(60–100), glandular (partly with large 0.5 mm-long and partly with small, 0.2 mm-long, yellow glands), more or less without stellate hairs. Ligule teeth ciliate; stigmas yellowish-brown. Flowering July to August.

Birch and coniferous forests.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from Scandinavia. Type in Stockholm?

Note. Our plant, collected on the Kola Peninsula, was identified by Elfstrand as var. *floccosius* Elfstr. (*Sv. Bot. Tidskr.* VIII, 2, 215).

222. **H. ussense** Pohle and Zahn in *Allgem. Bot. Zeitschr.* XIII (1907) 112; Zahn in *Pflzr.* IV, 280, 686.—*H. hyparcticum* Elfstr. in *Sv. Bot. Tidskr.* VIII, 2 (1914) 217; nec Almqu.—*H. sukaczewii* Zahn in *Pflzr.* IV, 280 (1921) 686; Krylov, *Fl. Zap. Sib.* XI, 3053.

193 Perennial. Stem 25–55 cm high, 1–3 mm in diameter, covered with scattered, soft, white hairs 1.0–2.5 mm long, more or less glabrous above, with occasional glands and denser stellate hairs. Basal leaves to 4, outer small, oval, others elliptical, oblong, and oblong-lanceolate, to 16 cm long (4.5:1), oblong or acuminate, spinescent, more or less abruptly or gradually narrowed to petiole, more or less entire or scatteredly denticulate, sometimes with 1–2 larger teeth near base of lamina, light green, pale or colored beneath, sparsely short-pubescent (hairs 0.6–1.0 mm long) on both sides, as a whole to scattered-pubescent, along petiole somewhat hairy with soft white hairs, with rare tiny glands; cauline leaves 1–3 (coefficient of leafiness 0.05), remote, lanceolate or linear, acute, more or less entire or with 3 small teeth, upper leaf stellate-hairy beneath. Inflorescence quite openly (remotely) paniculate, of (1–)3–8(–12) capitula; peduncles without simple hairs, with sparse to scattered glands 0.5 mm long, gray-tomentose. Involucres 10–11 mm long, cylindrical, later truncate; involucral bracts somewhat broad, more or less obtuse to acute, lanceolate, dark, without simple hairs, to densely (70–80) glandular, with large glands 1 mm long, at base densely, along margin moderately, stellate-hairy. Ligule teeth eciliate; stigmas dark. Flowering July to August.

Coniferous and mixed forests, on stony forested mountain slopes, riverbanks.—*European Part*: Arctic Europe (banks of Usa River); *Western Siberia*: Arctic Siberia. Endemic. Described from banks of Usa River. Type in Leningrad.

Note. Apparently, this plant is extremely rare; most of the reports in *Fl. Zap. Sib.* [Flora of the Western Siberia] under the name *H. sukaczewii* Zahn refer to various other species.

Cycle 10. Subnigrescentia Juxip.—Coefficient of leafiness medium (0.07–0.13).

223. **H. voroniense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 485.

Perennial. Stem 32–42 cm high, 2 mm in diameter, violet below, with scattered hairs 1.0–2.5 mm long, hairs denser and longer at base, without glands and stellate hairs. Basal leaves 2–3, obovate to lanceolate, abruptly narrowed to petiole (to 6 cm long), denticulate (4:1), densely short-pubescent (hairs 0.6–1.0 mm long), without small glands along margin; cauline leaves 3 (coefficient of leafiness 0.08), lanceolate, with 2–3 small teeth, moderately pubescent. Inflorescence openly paniculate, of 4–5 capitula; peduncles without simple hairs, with scattered tiny glands 0.3–0.5 mm long and scatteredly stellate-hairy. Involucres 11 mm long; involucre bracts obtuse, glabrous, but densely (90–100) fine-glandular, glands 0.5 mm long, dorsally sparsely but along margin densely stellate-hairy. Ligule teeth ciliate; stigmas dark. Flowering July to August.

194 Sandy riverbanks.—*European Part*: Arctic Europe. Endemic. Described from Murmansk Region (Gavrilovo). Type in Kirovsk.

Note. It is distinguished from the related species *H. murmanicola* Zahn by the dark stigmas and longer involucres.

224. **H. murmanicola** Zahn in Pflzr. IV, 280 (1923) 686.

Perennial. Stem 30 cm high. Basal leaves spatulate or lanceolate, narrowed to long petiole, acuminate, denticulate, softly-pubescent and scattered-glandular; cauline leaves 2–3 (coefficient of leafiness 0.08), lanceolate, upper leaves narrow or bracteiform. Inflorescence with 3–8 capitula. Involucres 8–9 mm long; involucre bracts somewhat broad, more or less obtuse, without simple hairs, with fine glands, with sparse but along margin more conspicuous stellate pubescence. Stigmas yellowish-brown. Flowering July to August.

European Part: Arctic Europe. Endemic. Described from Murmansk Region (Vostochnaya Litsa). Type unknown.

Note. The description is based on Zahn's (l. c.) incomplete diagnosis.

225. **H. eximiiiforme** Dahlst. in Acta horti. Berg. I, 7 (1891) 21; Elfstr. in Sv. Bot. Tidskr. VIII, 2, 213; Zahn in Pflzr. IV, 280, 667.—**Exs.**: Dahlst. Hier. Scand. exs. XV, No. 10.

Perennial. Stem 25–45 cm high, rather thick and rigid, rather densely long-pubescent in lower part, weakly tomentose above, more densely stellate-tomentose below, eglandular. Basal leaves numerous, spatulate or ligulate and obtuse to oblong-ovate, lanceolate or rhomboid, more or less obtuse, narrowed to long, winged petiole, almost entire to denticulate or crenate, all leaves bluish-green, covered with more or

less long hairs on both sides, with particularly dense and long hairs along midrib beneath and on petioles, sparsely stellate-hairy beneath (more conspicuous along midrib). Cauline leaves 2–5 (coefficient of leafiness 0.10), either forming rosette more or less evenly distributed, gradually reduced to bracteiform leaves, oblong-ligulate to lanceolate or rhomboid leaves, more or less entire or denticulate, or with 2–3 larger teeth in middle of lamina (hence, leaf looks rhomboid), cuneately narrowed, sessile, middle leaves with tapered base, somewhat amplexicaul, obtuse or short-acuminate. Inflorescence openly paniculate, of 2–6 capitula; peduncles to densely covered with long whitish hairs having black base, with tiny occasional or sparse glands, tomentose. Involucres 12–15 mm long, thick, ovate; involucral bracts narrowed from broad base to subacute tip, black, with green border, outer bracts somewhat loose, foliaceous, inner appressed, very densely covered with grayish hairs with black base (hence involucre looks
 195 sericeous-lanate) and with occasional to sparse tiny glands (hidden under dense pubescence, hence difficult to notice), sparsely stellate-hairy beneath. Corolla dark yellow, highly radiate; ligules broad, weakly ciliate; style dull green, darkly pubescent, turning darker; stigmas light-colored inside. Flowering July to August.

Mountain slopes.—*European Part*: Dvina-Pechora. *General distribution*: Scandinavia. Described from Norway (Valders). Type in Stockholm,

Note. Elfstrand (op. cit.) made the following comment on this species: “Die Exemplare dieser gut charakterisierten Art von Töll—Poss. (12 and 14.VIII.1907, R. Pohle) Stimmen mit denjenigen aus Valders in Norwegen fast Vollständig überein.” In view of the fact that Zahn identified the above-named specimens as *H. stenopiforme* Pohle and Zahn and as a synonym also mentioned it in his monograph (op. cit.), Elfstrand adds: “Mit *H. stenopiforme* Pohle and Zahn p. p. vom Paijer, ist sie nicht nur nicht identisch, sondern nicht einmal naher verwandt.”

Cycle 11. Manifesta Juxip.—Coefficient of leafiness high (0.25); cauline leaves to 9.

226. **H. manifestum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 485.

Perennial. Stem 25–30 cm high, 2.5 mm in diameter, uniformly and scatteredly covered throughout with hairs to 3 mm long, sparsely glandular with glands 0.1–0.5 mm long. Basal leaves 5, obovate, spatulate to lanceolate, narrowed to winged base, acute, with curved prickles at tip, to 10 cm long (6–7:1), more or less entire or with 3–5 small crenate teeth, slightly wavy, to scatteredly pubescent, with tiny glands

along margin; cauline leaves 7(5–9) (coefficient of leafiness 0.26), narrowly lanceolate (10–11:1), acute, with stellate hairs along margin. Inflorescence openly dichotomously paniculate, of (1–)3–5(–6) capitula; peduncles moderately long-pubescent (hairs 4 mm long), with occasional glands 0.5 mm long, with scattered stellate hairs. Involucres 14.5 mm long, truncate; involucral bracts densely, 100(85–115), hairy, more densely at base, with hairs 2.5 mm long, with sparse, 43(35–55), glands 0.1–0.2 mm long, without stellate hairs. Corolla teeth ciliate; stigmas dark. Flowering July to August.

Mossy larch forests.—*Western Siberia*: Arctic Siberia. Endemic. Described from basin of Lyapin River. Type in Leningrad.

Note. In habit, it strongly resembles *H. gorodkowianum* Juxip; however, in inflorescence characters it is closer to subsection *Atrata* (not *Nigrescentia*) and is related to *H. eximiiforme* Dahlst., from which it is distinguished mainly by a higher coefficient of leafiness.

196 *Subsection 4. Alpivulga* Juxip.—Inflorescence openly paniculate, with on average 6(1–15) capitula; cauline leaves average 3–4(8). Besides scattered tiny glands, inflorescence with more or less well-developed glands. The species of this subsection are more distant from section *Alpina* than the species of subsections *Nigrescentia* and *Atrata* and are related to section *Vulgata* (and more or less also to *Prenanthoidea*).

Cycle 12. Conspurcantia Juxip.—Inflorescence of 2–10 capitula; coefficient of leafiness low (0.05), i.e., cauline leaves 0–2(3).

227. **H. rohacsense** Kit. in Linnaea, XXXII (1863) 422; Zahn in Asch. and Graebn. Synopsis, XII, III, 208.—*H. conspurcans* Norrl. Bidr. (1888) 98; Zahn in Pflzr. IV, 280, 699.—*H. rauzense* (Murr.) Zahn in Koch, Synopsis, 3, III (1901) 1893; Zahn, Hier. Schweiz. 392.—**Ik.**: Rchb. Ic. XIX, 2, 192.—**Exs.**: Norrl. Hier. exs. No. 118.

Perennial. Stem 15–50 cm high, often flexuous (lateral stems 2–4); violet, somewhat puberulent at base, sparsely glandular, stellate-hairy throughout (very densely at tip). Basal leaves 2–10, outer small, ovate to oblong, more or less obtuse, others ovate- or oblong-lanceolate, innermost leaves lanceolate, more or less acuminate, narrowed to petiole, violet at base, sinuate-toothed, glaucescent to straw-green, pubescence quite sparse (above often almost absent), along petiole densely hairy, with hairs 2.5 mm long, more or less stellate-hairy beneath, along margin very sparsely finely glandular; cauline leaves 0–2(–3) (coefficient of leafiness 0.05), oblong-lanceolate to linear, strongly long-acuminate, lower leaves often coarsely toothed, stellate-hairy

beneath. Inflorescence strongly dichotomously or openly paniculate, of 2–10 capitula; peduncles bent-squarrose, usually moderately or sparsely pubescent, sparsely or moderately glandular, more or less grayish-tomentose. Involucres (10–)11–13(–15) mm long, ovate, later hemispherical; involucre bracts rather obtuse to very acute (inner bracts) dark, to moderately pubescent (hairs with thick dark base and light-colored tip). Sparsely to moderately glandular (in part finely) glandular, densely stellate-hairy along margin. Corollas golden yellow, often weakly ciliate; stigmas dark; achenes blackish. Flowering July to August.

In mountains together with *H. bifidum* Kit.—*European Part*: Upper Dniester (Carpathian Mountains: Marmarosh). *General distribution*: Scandinavia, Central Europe, Atlantic Europe. Described from Hungary. Type in Budapest?

Note. It is a highly polymorphic species, which in habit approaches sometimes *H. bifidum* Kit. and sometimes *H. atratum* Fr., differing from the latter by having a less glandular inflorescence, but dense stellate pubescence on the peduncles and involucre bracts and more or less glaucescent, less glandular leaves.

Cycle 13. *Alpitranssilvanica* Juxip.—Coefficient of leafiness medium (0.11–0.13).

- 197 228. ***H. lomnicense*** Wol. in Spraw. kom. fiz. Ak. Krak. XXV (1890) 65, and in Öster. Bot. Zeitschr. (1891) 111, 140; Zahn in Magyar. bot. lapok. 156; Zahn in Pflzr. IV, 280, 721; Asch. and Graebn. Synopsis, XII, III, 247.

Perennial. Stem 25–35 cm high (sometimes 2–3 lateral stems), green, densely covered with light-colored hairs, to 2.5 mm long, glandular and stellate-hairy. Basal leaves numerous, broadly elliptical to oblong-spatulate, tapered to long petiole (to 15 cm long) (5:1), to acute, scarcely toothed to coarsely toothed, dark green, on both sides densely covered with hairs to 2.5 mm long, somewhat fine-glandular along margin; cauline leaves 3–5 (coefficient of leafiness 0.13), often long and large, lanceolate, lower leaves tapered to petiole, sinuate-toothed, middle ones narrowed, sessile, with many fine teeth to coarsely toothed, at base densely pubescent. Inflorescence dichotomously paniculate, of 3–8(–10) capitula; peduncles densely hairy and glandular, grayish from stellate hairs. Involucres 10.0–12.5 mm long; involucre bracts somewhat broad, acute, dark, with green margin, sparsely pubescent, very densely fine-glandular, almost without stellate hairs. Corollas light yellow, often tubular, corolla teeth ciliate; stigmas dark; achenes blackish. In habit resembling *H. atratum* Fr. Flowering July to August.

Elfin woodlands, at 1600–1900 m.—*European Part*: Upper Dniester (Carpathian Mountains). *General distribution*: Central Europe (Carpathian Mountains). Endemic. Described from Carpathian Mountains. Type in Lvov?

Note. We include here *H. czeremoszense* Wol. (in *Magyar bot. lapok*. 162; *Pflzr.* IV, 280, 722).

229. **H. krasanii** Wol. in Spraw. kom. Ak. Krak. XXV (1890) 64, XXVII, 125; Zahn in *Pflzr.* IV, 280, 711; Asch. and Graebn. *Synopsis*, XII, III, 232.

Perennial. Rhizome fleshy; stem 20–35 cm high, slender (often with 2–4 lateral stems), with hairs 2–4 mm long, dense at base, decreasing upward, stem more or less glandular and stellate-hairy throughout. Basal leaves generally numerous, oblong to spatulate (to 18 cm long) (9:1 !), obtuse or acuminate, abruptly or more or less gradually narrowed to petiole, entire or denticulate, more rarely teeth deeper, straw- or yellow-green, pubescence moderate to quite dense on both sides, dense along margin, midrib beneath and on petioles, hairs 2–4 mm long, glandular along margin, very sparsely stellate-hairy beneath; cauline leaves 1–3(–5) (coefficient of leafiness 0.11), oblong-lanceolate to linear, mostly long-acuminate, subsessile to sessile, entire or denticulate. Inflorescence openly paniculate or strongly dichotomous, of 2–5(–15) capitula; peduncles slender, scarcely or densely pubescent, moderately to densely glandular, more or less tomentose. Involucres
198 8–11(–13) mm long, cylindrical, later ovate; involucre bracts somewhat broad to narrow, subacute to acute, blackish, inner with somewhat light-colored margin, sparsely to moderately dark-pubescent, densely (to moderately) glandular, usually without stellate hairs, being present sometimes only at base. Corollas yellow; stigmas yellow to dark; achenes brown to black; pappus white. Flowering July to August.

High-mountain zone of Carpathian Mountains (together with *H. transsilvanicum* Heuffl.). *European Part*: Upper Dniester (Kukul, Chorna Mountain, Sukhard, Sinyak, Popadya, Minchel, Chivchina, Pikui). *General distribution*: Central Europe (Carpathian Mountains). Endemic. Described from Carpathian Mountains. Type in Lvov?

Note. *H. chloribracteum* Degen. and Zahn (*Magyar. bot. lapok*. 122; *Pflzr.* IV, 280, 713; Asch. and Graebn. *Synopsis*, XII, III, 235) is very close to this species, which is found in the eastern Carpathian Mountains (Sivula) and is distinguished from *H. krasanii* by having fewer hairs, but very dense glands in the inflorescence and on the involucre bracts, and a more ovate shape of the involucre.

Cycle 14. **Sudetica** Juxip.—Coefficient of leafiness high (0.20).

230. *H. fritzei* F. Schultz in Flora, XXX (1872) 281; Zahn in Pflzr. IV, 280, 718; in Asch. and Graebn. Synopsis, XII, III, 240.—*H. sudeticum* Tausch in Flora XX (1837), Erg.-Bl. 68; non Fr., nec Froel., nec Sternb.—*H. montanum* G. Schneider in Oster. Bot. Zeitschr. XXXVI (1886) 21; non N.P.—*H. polymorphum* G. Schneid. in Jahresb. Schles. Ges. Veterl. Kult. (1885); in Oster. Bot. Zeitschr. XXXVII, 240.

Perennial. Stem (20-)12-25(-35) cm high, slender to rather thick, often flexuous, pubescence often throughout moderately to densely hairy with hairs light-colored, dark at base, with dark, bristly hairs 4-5 mm long above, with glands and stellate hairs scattered along whole stem, thicker upward. Basal leaves absent or few, outer obovate or rounded to spatulate, obtuse, inner oblong-lanceolate, more or less acute or subobtuse, narrowed to petiole, denticulate to dentate, often plicate at tip; cauline leaves 2-6 (coefficient of leafiness to 0.20), rarely more, but then basal leaves absent, leaves gradually reduced to bracts, obliquely turned at tip, oblong-lanceolate, usually acute, narrowed to petiole or more or less amplexicaul, denticulate, upper leaves lanceolate, acute; all leaves dark bluish-green (less often light-green), with both sides densely covered with hairs 2-3 mm long, with scattered glands along margin, without stellate hairs. Inflorescence dichotomously paniculate, of 1-3(-10) capitula; peduncles conspicuously dark-bristly, to scattered-glandular and densely stellate-hairy. Involucres (10-)12-15(-17) mm long, hemispherical; involucral bracts linear-lanceolate, somewhat broad, obtuse to more or less acute, outer
199 bracts slightly squarrose, green, inner dark, with light-colored border, moderately, 38(24-58), pubescent, with hairs to 3 mm long, glands dense, 95(70-130), 0.2-0.5 mm long, stellate hairs to moderate. Corollas golden yellow, often tubular; corolla teeth sparsely ciliate; stigmas black to dark, less often yellowish-brown; achenes reddish-brown to black. Flowering July to August.

Elfin woodlands and alpine meadows in central zone, at 1000 to 2100 m.—*European Part*: Upper Dniester (Carpathian Mountains). *General distribution*: Central Europe (Carpathian and Sudeten mountains). Described from the Sudeten Mountains. Type unknown.

Note. *H. scitulum* Wol. is closely related to this species (*Spraw. Kom. fiz. Ak. Krak.* XXI (1887) 128; Zahn in Pflzr. IV, 280, 720; in Asch. and Graebn. Synopsis, XII, III, 244.

Section 11. Pannosa Zahn in Magyar bot. lapok (1906) 69; Rchb. Ic. Fl. Germ. XIX, 2, 107; Zahn in Pflzr. IV, 280, 560; in Asch. and Graebn. Synopsis, XII, III, 47.—*Andryaloidea orientalia* Fr. Epicr. (1862) 74, 76.—*Tomentosa* N.P. (1889) 272 p. p.—Leaves mostly clustered at base or slightly above (and here larger) forming a

pseudo-rosette, abruptly reduced toward top, all leaves densely covered with curly-plumose hairs and tiny glands. Inflorescence dichotomous to paniculate; capitula large. Involucral bracts acute, distinctly imbricate, with long woolly hairs and occasional glands as also on peduncles. Stigmas yellow; margin of alveoles toothed but not ciliate; achenes stramineous or light green to yellowish-brown.

Species of this section are native to the Balkans-Asia Minor region; in our country so far found in the zone bordering Turkish Armenia (in the former Artvin District), but could be found in Southern Transcaucasia.

1. Leaves entire or denticulate; involucre 14–20 mm long.....231. **H. pannosum** Boiss.
- + Leaves distinctly toothed; involucre 11–15 mm long.....232. **H. koenigianum** Zahn

Cycle 1. Pannosa.—Leaves entire or denticulate, densely lanate-villous from plumose hairs; involucre 14–20 mm long.

231. **H. pannosum** Boiss. Diagn. I, 4 (1844) 32; Fl. or III, 869; N.P. Hier. Mitteleur. II, 286; Zahn in Pflzr. IV, 280, 561; Asch. and Graebn. Synops. XII, III, 48; Grossh. Fl. Kavk. IV, 269.—*H. taygetum* Boiss. and Heldr. Diagn. I, 7 (1847) 15.—*H. orientale* Fr. Epicr. (1862) 74.— **Ic.:** Rchb. Ic. Fl. Germ. XIX, t. 194, fig. II.

200 Perennial. Rhizome very fleshy, covered with brown remnants of leaves; stem 10–40 cm high, thick, erect, with very dense, white-lanate, plumose pubescence (hairs 5–7 mm long), densely long-haired at base; less hairy and hairs stiffer upward; cauline leaves to 12(–20) (coefficient of leafiness 0.50), bottom small, obovate-spatulate, less hairy, withering early, others large, almost equal-sized, crowded at stem base or slightly above, obovate, oblong, or oblong-lanceolate, obtuse to more or less acute, tapered toward base (subsessile), entire to denticulate or somewhat distinctly sharply toothed (ssp. *bornmulleri* Freyn), very densely lanate-tomentose on both sides from silky, snow-white, curled, plumose hairs 2–3 mm long or leaves less densely lanate (ssp. *bornmulleri* Freyn), without stellate hairs, with tiny glands along margin, midrib beneath and on petioles, leaves rapidly reduced upward from pseudo-rosette so that top of stem appears devoid of leaves, uppermost leaves small, narrow, becoming bracteiform. Inflorescence with deep and long, dichotomous branches to openly paniculate, of 2–7(–12) capitula; peduncles thick, obliquely upward-directed, white-tomentose, with small leaves, more or less covered with plumose hairs 5–7 mm long, with tiny glands (under magnifying glass!) below



capitula. Involucres large, 16–20 mm long; capitula spherical; involu-
cral bracts linear, acute, poorly visible under long, dense, 90(75–120),
sericeous, plumose hairs 5–7 mm long, sparsely or moderately stellate-
hairy, with sparse (5–30) tiny glands at tip of leaf (under magnifying
glass!). Corolla light yellow; ligule teeth eciliate; stigmas yellow;
achenes 3.5–4.5 mm long, stramineous to pale brown. Flowering July
to August.

Middle and upper mountain zones, on rocks, at (400)1300–
2200(2900) m.—*Caucasus*: Possibly growing in Southern Transcaucasia.
General distribution: Balkans-Asia Minor, Armenia-Kurdistan.
Described from Greece? Type in Geneva.

Note. Hairs on old herbarium specimens are often ginger-colored.

Cycle 2. Pilosissima Juxip.—It is distinguished from *H. pannosum*
by less dense pubescence on leaves and whole plant; leaves distinctly
toothed, capitula usually many, but shorter; involucres 11–13 mm long.
(*H. pilosissimum* Friv. in *Flora*, XIX, 1836, 436; Boise. *Fl. or.* III, 868;
Zahn in *Pflzr.* IV, 280, 593).

232. **H. koenigianum** Zahn in Vestn. Tifl. Bot. Sada, 12 (1908) 8;
Zahn in *Pflzr.* IV, 280, 594.

Perennial. Stem 10–25 cm high, very densely pubescent at base,
less densely upward, densely stellate-hairy below inflorescence. Cauline
leaves 10–12 (coefficient of leafiness 0.65), lower quite large, oblong-
lanceolate or ligulate, short-acuminate, plicate, long-tapered toward
base or short-petiolate, unevenly and coarsely serrate with wavy teeth,
203 grass green, very densely hairy on both sides, lanate-bearded along
midrib beneath from silky, white, plumose hairs, 3–6 mm long, leaves
fewer above pseudo-rosette, 2–3, small and densely lanate. Inflores-
cence with 2–3 branches already from middle, capitula 4–10; peduncles
grayish-green, moderately pubescent, scatteredly finely glandular and
tomentose at tip. Involucres 11–13 mm long; involucral bracts narrow,
acute, blackish-green, with light-colored border, moderately pubes-
cent, finely glandular and somewhat stellate-hairy. Stigmas yellow;
achenes chestnut-colored. Flowering July to August.

Mountains, on rocks.—*Caucasus*: Possibly found in Southern
Transcaucasia. *General distribution*: Eastern Anatolia. Described from
Olta District (former Kars Region) along Olta-Chai River. Type unknown.

Section 12. Oreadea Fr. Epicr. (1862) 82 p. p.; Lbg. in Hartm.
Handb. Scand. Fl. ed. 11, 41; Peter in Pflanzenfam. IV, 5, 381; Norrl. in
Mela-Cajander, Suom. Kasvio, 683; Zahn in *Pflzr.* IV, 280, 212; Lindm.
Svensk. Fan. Fl. 2 ed. 589; Asch. and Graebn. Synopsis, XII, II, 243.—

Leaves bluish-green, coriaceous, with more or less conspicuous, squarrose, stiff bristles along margin, ovate to lanceolate, mostly shortly contracted toward base; cauline leaves few (0–3), but then with persistent rosette, or cauline leaves more (4–12), but then basal leaves withering before anthesis. Inflorescence more or less openly paniculate, with few capitula. Involucres medium-sized to quite large (10–15 mm long); involucre bracts with hairs and glands in different proportions, invariably mixed with tiny glands, margin of alveoles ciliate or somewhat incised. Ligule teeth often ciliate, stigmas yellow (very rarely blackish-green); achenes black, 3.5–4.2 mm long.

Two regions of distribution are observed: 1) Southern and partly Central Europe and Asia Minor; and 2) northwestern Europe (Scandinavia, Atlantic Europe), joined at the southern tip of Sweden and the facing part of Germany. The northeastern distribution boundary passes through the northwestern part of the Kola Peninsula.

For substrate the species of this section prefer silicate rocks, grow on granite rocks, and apparently are always absent from limestone soils (calciophobes).

This section is extremely rare in our country. We include here the aggregate species *H. saxifragum* Fr. Besides, we may also find *H. acrophaeum* Sael. in the northern part of the Kola Peninsula (based on the report of Norrlin, l. c., p. 686), and, accordingly, we offer a tentative key to identify them.

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|-----|----|--|-------------------------------|
| | 1. | Cauline leaves 1–3, rosette of few leaves, persisting at anthesis; involucre bracts with numerous tiny yellowish glands and short gray hairs..... | 233. <i>H. saxifragum</i> Fr. |
| 204 | + | Cauline leaves 4–12; basal leaves withering before anthesis; involucre bracts with scattered black glands and black hairs; tips of involucre bracts reddish..... | * <i>H. acrophaeum</i> Sael. |

233. *H. saxifragum* Fr. Symb. (1848) 100; Epicr. 87; Dahlst. Bidr. Sverig. Hier.-Fl. III, 197; Zahn in Rchb. Ic. Fl. Germ. XIX, 2, 91; Norrl. in Mela-Cajander, Suom. Kasvio, 648; Zahn in Pflzr. IV, 280, 255; Lindm. Svensk Fan.-Fl. 2 ed. 613; Asch. and Graebn. Synopsis, XII, II, 247; Samuelsson, Maps of Scand. Hier. sp. No. 25.

Perennial. Stem 20–50 cm high, hairs 1.5–2.0 mm in diameter with occasional hairs 1–2 mm long, with occasional tiny glands at tip, without stellate hairs. Basal leaves 3–4, elliptical to lanceolate, narrowed to short petiole, weakly toothed, to 9 mm long (3.5:1), glabrous above, along margin, on midrib and beneath with scattered stiff bristles 1.5–2.0 mm long, as a whole to scattered-hairy, glaucous, stiff; cauline leaves 1–2(3) (coefficient of leafiness 0.04), sessile, lanceolate to

linear, generally entire, upper leaves bracteiform. Inflorescence of 1–3 capitula, openly (dischotomously) paniculate; peduncles slender, with occasional short hairs, to sparsely fine-glandular with scattered stellate hairs. Involucres 10.5–12.5 mm long; involucral bracts lanceolate, acute, brownish-green, with sparse (20–25), stiff, gray bristles 1 mm long, and with moderate, 52(35–63), yellowish glands 0.3–0.1 mm long, more or less without stellate hairs. Stigmas yellow. Flowering June to July.

Clefts of granite rocks.—*Arctic*: European Arctic (Murmansk Region, Linakhammari on road to Barents Sea; O. Kuzenova and A. Dryakhlova, 30.VII.1954). *General distribution*: Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type unknown.

Note. On the range map of *H. saxifragum* Fr. (s. l.) G. Samuelsson indicates southern Norway and Sweden, the Åland Islands, and the southwestern tip of Finland (to 20° E. long.), and in the north the limit of the species hardly crosses (in Norway) 63° N. lat. The collection of our plant in the Far North, away from its range, suggests a species separate from the *H. saxifragum* cycle. In order to resolve the question, it would be necessary to examine all of the extensive material of *Oreadea* from the Scandinavian collections. Therefore, in the meantime we are restricting ourselves to referring it to *H. saxifragum* Fr., to which the characters of our plant most closely conform. *H. saxifragum* Fr. is a highly a polymorphic species, whose forms are distinguished most of all by the diversity of indument. In our country, they have not been studied adequately.

Section 13. Vulgata Fr. *Epicr.* (1862) 7 and 89 p. p.; Lbg. in Hartm. *Handb. Scand. Fl.* ed. 11, 43; Dahlst. *Bidr. Sydostr. Sverig. Hier.-Fl.* II, 31; Peter in *Pflanzenfam.* IV, 5, 382; Zahn in *Pflzr.* IV, 280, 284; Magyar. 205 bot. lapok. 25; Asch. and Graebn. *Synopsis*, XII, II, 361.—*Strips H. vulgati* Fr. *Symb.* (1848) 102 p. p.—Leaves green, less often somewhat glaucous, with soft curled hairs, without tiny glands, with cordate, truncate, or round base or narrowed to petiole, basal leaves rather numerous or few at anthesis; cauline leaves 0–1(–2), and stem more or less scapose or leaves more (3–18). Inflorescence paniculate (to almost corymbose), less often openly paniculate or dichotomous, and then with few capitula; involucres medium-sized (7–)8–11(–14) mm long; ligule teeth (almost always) eciliate; stigmas mostly dark or yellowish-brown, later turning dark, less often yellow; margin of alveoles not toothed; achenes mostly black.

The species of this section are distributed in Eurasia, with the center of diversity in Europe, where the majority of the species are concentrated in its montane regions; in North America, they are found as species introduced from Europe.

KEY TO SUBSECTIONS OF SECTION *VULGATA* FR.

1. Florets in capitula few (20–45); involucre small, 7–8(–11) mm long; involucre bracts light green or at most with bright green border, densely glandular, glabrous or with very few hairs, more or less without stellate hairs; inflorescences corymbose; pappus white; leaves mostly densely pubescent.....Subsection 1. **Transsilvanica** Zahn
- + Florets in capitula many (50–80); involucre usually large, (8–)9–11(–13) mm long; involucre bracts dark; pappus mostly dull white....2.
2. Inflorescence paniculate or corymbose; leaves mostly green (less often glaucous), usually distinctly pubescent.....3.
- + Inflorescence dichotomously branched, with erect branches, usually with few capitula; leaves mostly glaucescent, slightly pubescent (almost glabrous above); involucre bracts and peduncles more or less eglandular or with sparse tiny glands 0.2–0.4 mm long, but with numerous short hairs (average ratio of hairs to glands 70:30).....7.
3. Involucre bracts and peduncles with more or less numerous hairs, but sparse to scattered glands (average ratio of hairs to glands 70:30).....4.
- + Involucre bracts and peduncles usually with more or less dense, well-developed glands, glabrous or sparsely hairy (average ratio of hairs to glands 10:90).....5.
4. Average coefficient of leafiness 0.07, i.e., cauline leaves 2(3–10); basal leaves at anthesis few, 2–3(0–10); lamina gradually narrowed to petiole; leaves moderately pubescent; inflorescence paniculate; glands well developed though tiny....Subsection 2. **Laevicaulia** Juxip
- 206 + Average coefficient of leafiness 0.03, i.e., cauline leaves (0–)1–2; basal leaves at anthesis many, 6(2–12); lamina mostly abruptly narrowed to petiole or base truncate to sagittate; leaves very densely pubescent; inflorescence corymbose; glands fine, weak, in part as if undeveloped.....Subsection 8. **Sagittata** Juxip
5. Average coefficient of leafiness 0.07, i.e., cauline leaves 2(3–10); basal leaves at anthesis usually few, 2–4(0–10); lamina narrowed to petiole; i.e., indistinctly delimited from petiole.....6.
- + Average coefficient of leafiness 0.03, i.e., cauline leaves (0)1–2; basal leaves at anthesis usually many, 3–6(1–13); lamina clearly delimited from petiole, its base (at least in some leaves) cordate, truncate, or round; inflorescence corymbose, candelabrum-like, with branches bent above.....Subsection 5. **Muroria** Juxip

6. Lamina gradually narrowed to petiole, involuclral bracts and peduncles with well-developed glands of medium size, 0.4–0.6 mm long.....Subsection 3. **Vulgata**
- + Lamina usually abruptly narrowed to petiole, involuclres and peduncles with large glands 0.7–1.2(1.5) mm long, mostly glabrous or with occasional hairs.....Subsection 4. **Diaphanoidea** Juxip
- 7 (2). Average coefficient of leafiness 0.05, i.e., cauline leaves 2–5(10); lamina more or less abruptly narrowed to petiole.....Subsection 6. **Caesia** Juxip
- + Average coefficient of leafiness 0.02, i.e., cauline leaves 0–1(–2); lamina clearly delimited from petiole, base of lamina cordate, truncate, or round; stem more or less scapose.....Subsection 7. **Bifida** Juxip

Subsection 1. Transsilvanica Zahn in Pflzr. IV, 280 (1921) 286; Asch. and Graebn. Synopsis, XII, II (1931) 362, 763.—*Pleiophylla* Peter in Pflanzenfam. IV, 5 (1894) 377; nec G. Schneider.—*Eriophylla* K. Maly in Verh. zool.-Bot. Ges. Wien, LIV (1904) 306, non Arv.-Touv.—*Barbulata* Arv.-Touv. Catal. (1931) 331 p. p.—Capitula small, mostly cylindrical; involuclral bracts light green or at least brightly green-bordered; florets in capitula few (20–45); stigmas yellow, later turning brown, very rarely dark; pappus pure white; inflorescence corymbose-paniculate, multicapitulate, densely glandular, leaves grassy-green, densely pubescent; basal leaves usually many, (rarely 0–2), leaves narrowed to petiole; pollen absent; achenes dark brown.

1. Coefficient of leafiness low (0.03–0.07), i.e., stem not densely (0–6) leafy; leaves not amplexicaul; ligule teeth eciliate.....2.
- 207 + Coefficient of leafiness comparatively high (0.13–0.25), i.e., cauline leaves on average 12(8–20); leaves somewhat amplexicaul; ligule teeth ciliate.....235. **H. pocuticum** Wol.
2. Capitula small; involuclres 7–8 mm long, light green; involuclral bracts glabrous, without simple and stellate hairs, but with dense fine, light-colored glands; stigmas yellow; capitula with few florets, 20(25), outer ray florets 10; leaves and usually stem densely pubescent.....234. **H. transsilvanicum** Heuffel.
- + Capitula large; involuclres 8–11 mm long; involuclral bracts dark, but with light-green margin; involuclres sparsely stellate-hairy; stigmas dark; capitula with large number of florets, 40–(–45); leaves more or less densely pubescent.....3.
3. Base of lamina narrowed to petiole.....4.
- + Base of lamina truncate, cordate, or abruptly narrowed.....5.

4. Involucral bracts sparsely pubescent and glandular; inflorescence openly paniculate to strongly dichotomous.....236. *H. caesiogenum* Wol.
- + Involucral bracts with occasional hairs but quite densely glandular; inflorescence paniculate.....237. *H. jablonicense* Wol.
5. Involucral bracts usually only sparsely pubescent, sparsely and finely dark-glandular; inflorescence openly paniculate to strongly dichotomous.....238. *H. pseudobifidum* Schur.
- + Involucral bracts glabrous but densely glandular with thin, long dark glands; inflorescence panicle or corymb.....239. *H. praecurrens* Vukot.

234. *H. transsilvanicum* Heuffel in Verh. zool.-Bot. Ges. Wien, VIII (1858) 151; Öster. Bot. Zeitschr. 8, 27, non Lint., nec Williams; Zahn in Pflzr. IV, 280, 472; in Asch. and Graebn. Synopsis, XII, II, 763.—*H. transsilvanicum* Schur ex Fr. Epicr. (1862) 97.—*H. pleiophyllum* Schur in Verh. Siebenb. Ver. II (1851) 171, nomen, III (1852) 87, IV (1853) 46; Enum. Trassn. 394.—*H. leptcephalum* Vukot. Hier. Croat. (1858) 13.—*H. rotundatum* Zahn, non Kit. in Schult. Öster. Fl. ed. 2, II (1814) 439; Zahn in Pflzr. IV, 280, 472.—**lc.**: Rchb, Ic. Fl. Germ. XIX, 2, t. 82; Hegi, Ill. Fl. IV, 2, fig. 914.—**Exs.**: Fl. exs. Austro-Hung. No. 3363; Schultz. Herb. norm. nov. ser. cent. 117, No. 1611; Hayek, Fl. stiriaca, exs. No. 699; Zahn, Hier. Europ. No. 586.

208 Perennial. Stem 30–80 cm high, 1–3 mm in diameter, often several, reddish-brown at base and often densely pilose, short-hairy and scatteredly glandular above. Basal leaves (3–)6–10(–18), obovate to oblong or lanceolate, to 20 cm long, more or less abruptly narrowed to petiole, rounded or subacute, spinescent, with scattered large teeth at base, to entire, very densely pubescent on both sides and along margin, hairs short, 0.5–1.2 mm long, long-haired beneath along midrib and on reddish-brown petioles, hairs 2–4 mm long; cauline leaves (1–)2–4 (coefficient of leafiness 0.04), abruptly or gradually reduced, remote, lower leaves more or less petiolate, like basal leaves, others sessile, narrowed toward base, oblong-lanceolate to linear; all leaves yellowish-green, glaucescent beneath, often colored. Inflorescence corymbose, with 2–25 capitula, its branches in upper part clustered, remote below and arcuate; peduncles slender, without simple hairs but densely fine glandular, glands 0.3–0.2 mm long, gray from stellate hairs; capitula small, 7–8 mm long, cylindrical (in appearance similar to capitula of *H. piloselloides*), with few (20–25) florets; involucral bracts narrow, acute, light green, with broad, bright green border, without simple and stellate hairs but densely, 70(25–100), glandular with golden brown glands (0.2–0.5(–1.0) mm long, crowded at tip).

Corolla sulfur-yellow; ligule teeth eciliate; stigmas yellow, later turning brown. Achenes 3.0–3.7 mm long, light- to dark-brown; pappus white, later somewhat yellowish. Flowering June to July. (Plate XII, Fig. 2.)

Open deciduous and coniferous montane forests, to 1800 m.—*European Part*: Upper Dniester (Carpathian Mountains). *General distribution*: Central Europe (Carpathian Mountains), Balkans-Asia Minor (northern part of Balkans Peninsula), Carpathians-Balkan. Endemic. Described from Banat (Carpathian Mountains). Type in Vienna?

Note. The species was collected in the Transcarpathian Region from Kherniava, Chorna Gora, Yablonitsa, Menchul, Yaremch, Petros, Stog and Vorokht; in the eastern Carpathian Mountains it apparently is not a rare plant.

235. **H. pocuticum** Wol. in Spraw. Kom. fiz. Ak. Krak. XXI (1887) 129; Zahn in Magyar. bot. lapok. 158; Zahn in Pflzr. IV, 280, 818; in Asch. and Graebn. Synopsis, XII, III, 383.—*H. juranum* Rehm. in Öster. Bot. Zeitschr. (1873) 217.—*H. rehmanni* Wol. l. c. and in Oster. Bot. Zeitschr. (1891) 111; nec N. P.

Perennial. Stem 40–80 cm high (often several stems), somewhat thick, flexuous, densely pubescent. Basal leaves at anthesis 0–2(4), large to 15 cm long or comparatively small, oblong or obovate-spatulate, round-obtuse (4–6:1), narrowed to rather long, winged petiole, to very coarsely toothed; cauline leaves (5–)8–16(–20) (coefficient of leafiness 0.13–0.25), oblong to ovate-lanceolate or ovate, serrate to coarsely toothed, lower with winged petioles, densely pubescent, upper sessile with rounded base, glabrous above or often pubescent only along margin; all leaves somewhat amplexicaul, green. Inflorescence paniculate, somewhat umbellate at top, with 5–50 capitula, with arcu-
209 ately spreading branches; peduncles slender, without simple hairs but very densely glandular, gray from stellate hairs. Involucres 8–10 mm long; involucral bracts somewhat broad, more or less obtuse to acute, without simple hairs but densely glandular, more or less without stellate hairs. Ligule teeth somewhat ciliate; stigmas dark; achenes blackish brown. Flowering July to August.

Larch and coniferous forests in mountains, at 1000–1600 m.—*European Part*: Upper Dniester (Carpathian Mountains: Sivula, Chorna Glava, Goverla, Chorna Gora, Kukul, Marmarosh, etc.). *General distribution*: Central Europe (Carpathian Mountains), Balkans-Asia Minor (Balkans). Endemic. Described from Carpathian Mountains. Type in Krakov.

Note. It is considered an intermediate link between *Transsilvanica* and *Prenantheoidea*. As is evident, it is not a rare plant in the Carpathian Mountains. *H. rapunculoidiforme* Wol. and Zahn, (*Pflzr.* IV, 280, 819) and *H. ukierniae* Wol. and Zahn, l. c., both growing in the Galician Carpathian Mountains, are very close to it.

236. **H. caesiogenum** Wol. and Zahn in Rchb. Ic. Fl. Germ. XIX, 2 (1906) 106, t. 85; Zahn in Pflzr. IV, 280, 483; in Asch. and Graebn. Synopsis, XII, II, 788.

Perennial. Stem 45–55 cm high, more or less puberulent but weakly glandular and at top densely stellate-hairy. Basal leaves 3–8, outer often small, rounded, inner ovate-lanceolate to oblong-lanceolate, narrowed to long, mostly violet, more or less densely pubescent petiole, somewhat obtuse to acute, very short-hairy, leaves bluish-light-green above, often violet beneath (young leaves densely short-pubescent on both sides but later more or less glabrous above), denticulate, toward base more or less toothed; cauline leaves 2–4 (coefficient of leafiness 0.06), ovate-lanceolate to linear, very toothed, stellate-hairy (lower leaves along midrib only). Inflorescence openly paniculate to strongly dichotomous, with 10–25 capitula; branches and peduncles slender, weakly pubescent and glandular, gray from stellate hairs. Involucres (8–)10–12 mm long; involucral bracts somewhat broad, subobtusate to acute, inner subulate, with light green border, with hairs 2 mm long, scarcely glandular and stellate-hairy. Corolla golden yellow; stigmas dark; achenes blackish. Flowering July to August.

On limestones, rarely.—*European Part*: Upper Dniester (Carpathian Mountains). *General distribution*: Central Europe (Carpathian Mountains), Balkans-Asia Minor (Balkans). Endemic. Described from Carpathian Mountains. Type in Lvov.

Note. It apparently is a hybrid species between *Transsilvanica* and *Caesia*. In habit it resembles *H. caesium* Fr., differing from it by the pubescence of the leaves.

- 210 237. **H. jablonicense** Wol. in Spraw. Kom. fiz. Ak. Krak. XXV (1890) 66; Zahn in Pflzr. IV, 280, 477; in Asch. and Graebn. Synopsis, XII, II, 775.—**Ic.**: Rchb. Ic. XIX, 2, t. 84, B.

Perennial. Stem 35–60 cm high, 1.0–1.5 mm in diameter, violet at base and to densely pubescent. Basal leaves 2–3, outer smaller, ovate or spatulate, obtuse, others to broadly lanceolate, acute, narrowed to petiole, denticulate to denate, very densely pubescent with fine, short (0.5–1.5 mm long) hairs (influence of *H. transsilvanicum*); cauline leaves 2–3(–6) (coefficient of leafiness 0.07), elongated or narrowly lanceolate, narrowed to petiole, denticulate upper leaves narrow, stellate-hairy above. Inflorescence corymbose-paniculate, with 3–15 capitula; peduncles slender, light gray from stellate hairs, without simple hairs but with moderate glands 0.6 mm long. Involucres 8–9 mm long, cylindrical; involucral bracts more or less broad, to acute, dark but with bright green border, sometimes with occasional hairs but to densely (60–85) glandular, glands 0.3–1.0 mm long. Stigmas usually yellowish-brown or

dark; capitulum with up to 40 florets; achenes almost black. Flowering June to August.

Open deciduous and coniferous forests in places where *H. transsilvanicum* Heuffel. is also found.—*European Part*: Upper Dniester (Carpathian Mountains). *General distribution*: Central Europe (Carpathian Mountains), Balkans-Asia Minor (Balkans). Described from Carpathian Mountains? Type in Lvov? Krakow?

Note. It is considered an intermediate form between *H. transsilvanicum* and *H. vulgatum*, apparently representing an ancient hybrid.

238. **H. pseudobifidum** Schur, Enum. Transs. (1866) 392, non Blocki; Zahn in Pflzr. IV, 280, 478; in Asch. and Graebn. Synopsis, XII, II, 776.—*H. trebevicianum* K. Maly in Glas. muz. Sarajevo, XI (1899) 149; Wiss. Mitt. Bosn.-Herc. VII, 550.—**!c.**: Rchb. !c. Fl. Germ. XIX, 2, t. 99.

Perennial. Stem 15–60 cm high (often several stems), at base sometimes densely pubescent, sometimes sparsely glandular, stellate-hairy at top. Basal leaves 4–8, outer small rounded, others ovate to elliptical or oblong-lanceolate, obtuse to acute, truncate to abruptly narrowed, usually long-petiolate, denticulate at base, with very short bristles above, densely long-pilose along midrib beneath and along petiole, stellate-hairy (often along midrib only), light to yellowish-green; cauline leaves 0–2 (coefficient of leafiness 0.03), bottom leaf often large, more or less petiolate, from broad base long-acuminate. Inflorescence openly paniculate to more or less strongly dichotomous, with (2–)7–30 capitula; peduncles divergently upward-spreading. Involucre (7–)9–11(–13) mm long; involucre bracts more or less narrow, acute, dark, with green margin, mostly sparsely short-pubescent, with sparse or few glands, sparsely stellate-hairy. Corollas golden yellow; stigmas dark; achenes dark brown. Flowering June to July.

211 Primarily on limestones.—*European Part*: Upper Dniester (Carpathian Mountains: Pikui). *General distribution*: Central Europe (Carpathian Mountains), Balkans-Asia Minor (Balkans). Described from Romania. Type unknown.

Note. It is considered to be a hybrid species between *Trassilvanica* and *Bifida*.

239. **H. praecurrens** Vukot. in Rad. jug. Ak. Zagr LVIII (1881) 167; Schedae ad Fl. Austro-Hung. exs. IX (1902) 56; Zahn in Pflzr. IV, 280, 474; in Asch. and Graebn. Synopsis, XII, II, 766.—**Exs.**: Fl. Austro-Hung. exs. Nos. 3362, 3366; Zahn, Hier. Europ. Nos. 633, 634.

Perennial. Stem 30–70 cm high, slender to somewhat thick, pubescence at base from sparse to dense, at top glandular and stellate-hairy. Basal leaves (to 15) with quite long, almost mane-like pubescent

petioles, outer small, rounded or elliptical, often withering before anthesis, others usually large, ovate to lanceolate, obtuse to acute, base of lamina cordate, truncate, or more or less or abruptly narrowed, leaves remotely toothed (at base teeth coarse to incised), often with free teeth on petiole, young leaves often long-pilose, mature leaves with short bristles above, long-pilose along midrib beneath, as a whole very densely pubescent resembling leaves of *H. sagittatum* Lindb.; cauline leaves (0-)1-3(-4) (coefficient of leafiness 0.04), bottom leaf petiolate, often large, ovate, short-acuminate, or smaller, oblong-lanceolate, others narrower, more or less long-acuminate, all leaves toothed to coarsely incised. Inflorescence corymbose-paniculate, with 4-25 capitula; peduncles usually without simple hairs, but densely glandular, gray from stellate hairs. Involucres 8.0-10.5(-11) mm long, ovate, capitulum with about 40 florets; involucre bracts somewhat broad to narrow, subacute to acute, dark but with clear light green border, glabrous but with dense, 60-80, fine dark glands to 1.0 mm long. Corolla teeth eciliate; stigmas yellow, later turning dark; achenes 2.8 mm long, blackish. Flowering June to August.

Open deciduous and coniferous forests on mountains, descending in valleys together with *H. transsilvanicum* Heuffl.—*European Part*: Upper Dniester (Carpathian Mountains). *General distribution*: Central Europe, Balkans-Asia Minor (Balkans). Described from Yugoslavia. Type in Zagreb?

Note. It is considered to be an intermediate form between *H. transsilvanicum* Heuffel. and subsection *Muroria*, being, apparently, a hybrid species. It is highly polymorphic, with some forms resembling *H. transsilvanicum*, while others approach species of subsection *Muroria* in their habit.

Subsection 2. *Laevicaulia* Juxip.—Zahn in Asch. and Graebn. Synopsis, XII, II (1955) 700, pro gr.—Characters given in the key to 212 subsections of section *Vulgata* Fr. Coefficient of leafiness 0.07(0.02-0.17), i.e., cauline leaves 2-9; basal leaves at anthesis 0 to 10; involucre bracts distinctly hairy and hairs found in quite diverse combinations with glands: from almost complete absence of the latter to a ratio of 1/3:2/3 between the number of hairs and glands. From species of subsection *Vulgata* similar to them in habit, members of subsection *Levicaulia* differ mainly by having tiny glands. Pollen almost always absent.

The range covers almost the whole of Eurasia with distinct thinning out eastward both in the number of species and the abundance of individuals. The majority of species are found on limestone substrate.

1. Number of on involuclral bracts many times more than number of glands, the latter occasional or completely absent (plants next to section *Tridentata*).....2.
- + Hairs and glands on involuclral bracts more or less equal in number (forms transitional to subsection *Vulgata*).....22.
2. Plants with more or less high coefficient of leafiness (0.17–0.14).....3.
- + Plants with medium to low coefficient of leafiness (0.14–0.02).....6
3. Involucres large (11.5 mm long); stem at base distinctly pubescent with hairs 5 mm long (Caucasus).....243. **H. endaurovae** Juxip
- + Involucres of medium length, stem at base indistinctly more or less short-pubescent.....4.
4. Stellate hairs on involuclral bracts absent or only on back of midrib.....5.
- + Involuclral bracts distinctly stellate-hairy, on both sides, without simple hairs above but setose along margin (Central Asia).....241. **H. turkestanicum** Zahn
5. Leaves finely sharp-toothed; stigmas dull-green; involucres 10–11 mm long (Baltic Region).....240. **H. alphostictum** Dahlst.
- + Leaves distinctly deeply toothed; stigmas yellowish-brown; involucres 9–10 mm long (northern region).....242. **H. pohlei** Zahn
6. Plants with medium (0.14–0.08) coefficient of leafiness.....7.
- + Plants with low (0.06–0.02) coefficient of leafiness.....16.
7. Leaves densely pubescent (unusual for section).....8.
- + Leaves moderately or sparsely pubescent.....10.
8. Stigmas dark; leaves always stellate-hairy beneath (sometimes above also), as also involuclral bracts (northern region).....245. **H. wologdense** Pohle and Zahn
- + Stigmas yellow or yellowish-brown; stellate pubescence of leaves (as also of involuclral bracts) weak.....9.
9. Plants found in Altai.....246. **H. korshinskyi** Zahn var. **abakanum** Juxip
- + Plants found in Caucasus.....248. **H. leucothyrsoides** Kozl. and Zahn
10. Leaves moderately pubescent; stigmas dark.....11.
- + Leaves sparsely pubescent or more or less glabrous.....12.
11. Stem, peduncles, and involuclral bracts along margin densely stellate-hairy; leaves with 2–4 large teeth (Caucasus).....249. **H. tephrophilum** Kozl. and Zahn
- + Stem and involuclral bracts weakly stellate-hairy; leaves sharply-denticulate (Siberia and Soviet Central Asia).....246. **H. korshinskyi** Zahn
12. Leaves to scatteredly pubescent.....13.

- + Leaves completely glabrous; peduncles and involucre bracts eglandular; stigmas dark (Caucasus).....244. **H. beschtaficiforme** Juxip
- 13. Stigmas yellowish-brown; plants of the North.....247. **H. subaquilonare** Juxip
- + Stigmas dark.....14.
- 14. Cauline leaves 3, narrowed toward base; stem at base distinctly white-pubescent (plants of Crimea).....250. **H. uczaussuense** Juxip
- + Cauline leaves 6-7, sessile, with broad, semicordate or semi-amplexicaul base; stem sparsely pubescent.....15.
- 15. Basal leaves 0-1, obovate, narrowed to short petiole; lower cauline leaves oval, very broad (2:1); involucre bracts with scattered hairs but more or less eglandular, moderately stellate-hairy (plants of Siberia).....251. **H. aczelmanicum** Schischk. and Serg.
- + Basal leaves 2-3, spatulate, long, narrowed to very long petiole; all cauline leaves lanceolate, somewhat broad (5:1); involucre bracts with sparse hairs and occasional glands, more or less without stellate hairs (plants of Caucasus).....252. **H. sarykamyschense** Juxip
- 16 (6). Involucres large (12.5 mm long); stigmas dark; plants of Caucasus.....253. **H. guidissense** Juxip
- + Involucres medium-sized.....17.
- 17. Leaves densely pubescent and more or less distinctly deeply (to incised) sharp-toothed.....18.
- + Leaves scatteredly (almost moderately) pubescent, and scarcely denticulate.....19.
- 18. Leaves glabrous above, but densely pubescent elsewhere; stigmas dark (plants of Baltic Region).....257. **H. praetervisum** Juxip
- + Leaves on both sides densely pubescent; stigmas yellowish-brown or dull green.....258. **H. borodinianum** Juxip
- 19. Involucre bracts more or less without stellate hairs.....20.
- 214 + Involucre bracts densely stellate-hairy; stigmas yellow.....255. **H. tritum** Juxip. var. **tritiforme** Juxip
- 20. Stigmas yellowish-brown.....254. **H. sersshukense** Juxip
- + Stigmas dark.....21.
- 21. Peduncles with occasional hairs and glands (or without hairs); cauline leaves 2-3(1-5) (coefficient of leafiness 0.06) (plants of northwestern and northern European Part of Soviet Union, Urals, and Western Siberia).....255. **H. tritum** Juxip
- + Peduncles with sparse (to scattered) hairs and sparse, tiny glands; cauline leaves 1-29 (coefficient of leafiness 0.03) (plants of Caucasus).....256. **H. karjaginii** Juxip
- 22 (1). Plants with more or less high coefficient of leafiness (0.20-0.13).....23.

- + Plants with medium to low coefficient of leafiness (0.10–0.04).....24.
- 23. Coefficient of leafiness 0.20; leaves more or less purple (plants of the North).....259. **H. subviolascens** Pohle and Zahn
- + Coefficient of leafiness 0.13; leaves light green, pale beneath (plants of Caucasus).....260. **H. membranulatum** Litw. and Zahn
- 24. Plants with medium coefficient of leafiness (0.10–0.18).....25
- + Plants with low coefficient of leafiness (0.07–0.04).....30.
- 25. Involucral bracts with tiny (0.2–0.3 mm long), occasional to sparse (10–20) glands.....26.
- + Involucral bracts with larger, sparse to scattered (25–40) glands27.
- 26. Leaves very short-toothed; stigmas dark; involucre more or less, large, 10.5–11.5 mm long (plants of Baltic Region)261. **H. agronesaeum** Juxip
- + Leaves abruptly and deeply incised (lobed); stigmas yellowish-brown to dark; involucre 9.5–10 mm long (plants of Siberia).....262. **H. schischkini** Juxip
- 27. Leaves scarcely denticulate (at first glance looking entire); basal leaves few.....28.
- + Leaves deeply and sharply serrate to falcately toothed; leaf rosette well-developed; stigmas dull green (plants of Baltic Region).....263. **H. falcidentatum** Juxip
- 28. Glands on involucral bracts of medium size (0.4–0.5 mm long); stigmas yellowish-brown or rusty (plants of northwestern European Part of Soviet Union).....264. **H. vulgatiforme** Dahlst.
- + Glands on involucral bracts large, 0.8–1 mm long.....29.
- 29. Stigmas yellowish-brown or rusty (plants of northwest).....264. **H. vulgatiforme** Dahlst. var. **ostiense** Juxip
- + Stigmas dark; glands in inflorescence to scattered (plants of Caucasus).....264. **H. gudergomiense** Juxip
- 215 30 (24). Involucral bracts with occasional to more or less sparse (10–15) glands.....31.
- + Involucral bracts with sparse to scattered (20–40) glands.....34.
- 31. Involucre quite large, 10–12 mm long; pubescence of leaves to weakly scattered; stigmas dark (plants of the North).....267. **H. coniois** Norrl.
- + Involucre small, 7.5–10 mm long.....32.
- 32. Pubescence of leaves sparse to scattered (plants of Baltic Region).....33.
- + Leaves densely pubescent; stigmas dark; florets often tubular (plants of the North).....266. **H. constrictiforme** Juxip
- 33. Stigmas dark; involucral bracts very obtuse, to sparsely pubescent; involucre 7.5–8.0 mm long.....268. **H. amblyolobum** Juxip

- + Stigmas yellow; involuclral bracts somewhat obtuse, with occasional hairs; involucre 8–10 mm long.....269. **H. lepiduliforme** Dahlst.
- 34 (30). Hairs and glands on involuclral bracts present in more or less equal number (or hairs slightly more than glands).....35.
- + Glands more than hairs on involuclral bracts (ratio of hairs to glands approximately 1:2); glands 20–50; involucre quite large.....41.
- 35. Leaves densely pubescent.....36.
- + Leaves moderately pubescent.....38.
- 36. Glands on involuclral bracts small, 0.1–0.4 mm long, on average to sparse (15) (plants of Siberia).....37.
- + Glands on involuclral bracts larger, 0.4–0.10 mm long, or on average to scattered (30) (plants of the North).....272. **H. teplouchovii** Juxip
- 37. Stigmas dark.....271. **H. ganeschinii** Zahn
- + Stigmas yellowish-brown.....271. **H. ganeschinii** var. **karakolense** Juxip
- 38. Stigmas yellowish-brown or dull green.....39.
- + Stigmas dark or black; involuclral bracts more or less without stellate hairs.....40.
- 39. Involuclral bracts conspicuously stellate-hairy (plants of Baltic Region).....273. **H. acroleucum** Stenstr.
- + Involuclral bracts very sparsely stellate-hairy (northern and northwestern region of the European Part of the Soviet Union)....274. **H. vulgatum** (Fr.) Almqu.
- 40. Leaves entire, sparsely pubescent, glabrous above; involuclral bracts narrow (plants of Caucasus).....275. **H. lipskyanum** Juxip
- + Leaves denticulate, to moderately pubescent (sparsely above); involuclral bracts broad (plants of Northwest).....270. **H. prolatatum** K. Joh.
- 216 41 (34). Stellate hairs of involuclral bracts sparse or absent; stigmas yellowish-brown to dark.....276. **H. incurrens** Sael.
- + Involuclral bracts densely stellate-hairy; stigmas yellowish-brown; leaves more or less glabrous above.....277. **H. chlorelliceps** Norrl.

Cycle 1. Alphosticta Juxip.—Number of hairs on involuclral bracts many times more than number of glands, or bracts completely eglandular; plants with more or less high (0.17–0.14) coefficient of leafiness.

240. **H. alphostictum** Dahlst. Beitr. Hier.-Fl. Oesels (1901) 43; Zahn in Pflzr. IV, 280, 404; Asch. and Graebn. Synopsis XII, II, 711.—**lc.**: Dahlst. Beitr. (1901) l. c. t. VIII.

Perennial. Stems 30–50 cm high, 1.0–1.5 mm in diameter, reddish and sparsely white-pilose at base, more or less glabrous, eglandular, sparsely stellate-hairy above. Basal leaves 2–3, elliptical to broadly lanceolate, to 11 cm long (4:1), finely (spinously) toothed, subacute; cauline leaves 5–6 (coefficient of leafiness 0.14), bottom leaf elliptic-lanceolate, abruptly narrowed to petiole (resembling basal leaves), others lanceolate, sessile, drawn out into widened base, upper leaves acuminate from ovate base, to entire at tip, the rest finely (3–7), sharply toothed, olive- or grassy-green, violet beneath, on both sides sparsely, but along margin scatteredly pubescent with hairs 1 mm long, to dense hairs 1.5 mm long along midrib beneath. Inflorescence paniculate of 3–5 capitula; peduncles glabrous (or with occasional hairs), eglandular, with scattered stellate hairs. Involucres 10–11 mm long, ovate, later truncate; involucre bracts somewhat broad, lanceolate, subobtusate to subacute, with colored tips, with occasional, 13(11–16), hairs 1.5 mm long, eglandular or with few, (0–2), glands 0.2 mm long, slightly stellate-hairy along margin to tip. Stigmas dull green (dark). Flowering July.

Open deciduous forests.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Saaremaa Island (Oesel). Type in Stockholm; cotype in Riga.

Note. In the original diagnosis, Dahlstedt says the following: “Diese Sippe gehört unzweifelhaft der Gruppe *Vulgata* an, obwohl sie ein sehr an *H. rigidum* erinnerndes Aussehen besitzt. Sie ist mit keiner mir bekannten schwedischen Formen näher verwandt.” For obvious reasons the number of endemic forms in the Baltic Region is quite small, excluding, however, the subgenus *Euhieracium*. The majority of the species of this subgenus reaching the eastern limit of their distribution here and coming under unusual climatic conditions, are able to evolve new forms. K.R. Kupffer, in his work *Grundzüge der Pflanzengeographie des Ostbaltischen Gebietes* (1925, 185), says the following about this phenomenon: “Nur die Gattung *Hieracium* zeigt auch bei uns...einen gewissen progressiven Endemismus (Diels, 1908) und hat schon Veranlassung zur Aufstellung einiger besonderer Elementararten für das Ostbaltische Gebiet geboten. Dahlstedt, der die Hieracien Ösels bearbeitet hat (1901), stellt für diesen Teil unserer Inselflora 5 neue Arten auf, nämlich *H. acroleuroides*, *H. alphostictum*, *H. furfuraceum*, *H. kupfferi* u. *H. lepiduliforme*.”

Similar interpretations are also applicable for explaining the endemic (neo-endemic) forms found in the Murmansk Region.

Perennial. Stem 30–60 high, at base violet and somewhat pubescent, eglandular, stellate-hairy throughout, very wide-branching. Basal leaves withering before anthesis; cauline leaves 6–9 (coefficient of leafiness 0.17), remote, gradually reduced, lanceolate, narrowed to slightly amplexicaul base, acuminate, with many narrow, sharp teeth, glabrous above or very sparsely short-pubescent, along margin setose, stellate-hairy on both sides, olive-green. Inflorescence openly paniculate, broad, with (3)6–25 capitula; peduncles sparsely short-pilose, more or less finely glandular with tiny glands, tomentose. Involucres 9–10 mm long, ovate, later truncate, involucre bracts narrow, acute, moderately pubescent with light-colored hairs with dark base, with sparse tiny glands, at base stellate-hairy. Stigmas dark. Flowering July to August.

Soviet Central Asia: Tien-Shan? Endemic. Described from Semireche Region (?). Type unknown.

242. **H. pohlei** Zahn in Allgem. Bot. Zeitschr. XIII (1907) 145; in Pflzr. IV, 280, 527.

Perennial. Stem 30–60 cm high, 1.0–2.5 mm in diameter, at base violet and somewhat softly, white-pubescent, without hairs and glands above, but stellate-hairy throughout, often strongly branching. Basal leaves withering before anthesis; cauline leaves 5–8 (coefficient of leafiness 0.14), lower crowded together or all leaves remote, bottom leaves withered, broadly lanceolate, narrowed to long, winged petiole, others sessile, with short-tapered base, upper leaves with rounded or even somewhat amplexicaul base, with short or mixed short and long large teeth (teeth to 10 mm long), glabrous above or very sparsely short-hairy (0.5 mm long), scattered-hairy beneath, with moderate pubescence along margin and midrib (hairs to 2.5 mm long), a little stellate-hairy along midrib; all leaves dark green. Inflorescence openly
218 paniculate, with (3–)6–25 capitula; peduncles scatteredly short-pubescent, with occasional glands or more or less eglandular, gray-tomentose. Involucres 9–10 mm long, ovate, later truncate, incised, involucre bracts lanceolate, acute or subacute, outer rather loose, or recurved, with scattered short pubescence and sparse glands (in part with tiny glands), somewhat stellate-hairy. Corolla partly tubular; stigmas yellowish-brown, later turning dark. Flowering July to August.

Limestone rocks.—*European Part*: Dvina-Pechora. Endemic. Described from the banks of Shchugor River (former Vologda Region). Type unknown.

243. **H. endaurovae** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 486.

Perennial. Stem 30 cm high, 2.5 mm in diameter, glaucescent, sulcate, with scattered soft hairs 5 mm long at base, occasional hairs above, eglandular, weakly stellate-hairy at top. Basal leaves withering before anthesis (?); cauline leaves 5 (coefficient of leafiness 0.16), lanceolate, narrowed to base, acuminate, with 3–5 curved, broad teeth, glaucescent, glabrous above, with occasional hairs along margin and beneath, hairs sparse, 2.5 mm long along midrib beneath, as a whole pubescence scattered. Inflorescence panicles, with few (3) capitula; peduncles with sparse hairs 2.5 mm long and occasional glands 0.2 mm long, grayish-tomentose. Involucres 11.5 mm long; involucre bracts (35) with 1.5 mm-long, light-colored, to scattered hairs and occasional (13) glands (0.2 mm long), at base sparsely stellate-hairy, glabrous above. Stigmas dull-green. Flowering June.

Montane deciduous forest, at 1260 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Teberba. Type in Leningrad.

Note. It is distinguished from other species of the series *Alphosticta* by a more or less high coefficient of leafiness (cauline leaves to 5) and large involucres.

Cycle 2. Korshinskya Juxip.—Number of hairs on involucral bracts many times more than number of glands; plants with medium coefficient of leafiness (0.08–0.10).

244. **H. beschtaeviforme** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 486.

Perennial. Stem 30–40 cm high, 1.5–3.0 mm in diameter without hairs and glands (glabrous), at top somewhat stellate-hairy. Basal leaves 5–6, elliptical to lanceolate, narrowed to petiole, more or less entire, to 14 cm long (4.5:1), with incurved margin, entirely glabrous; cauline leaves 3 (coefficient of leafiness 0.08), lanceolate, distinctly spatulate-toothed with 5–6 teeth, sessile, all becoming broader (4.5–3.2:1) upward, glabrous. Inflorescence paniculate, branched, with 4–14 capitula; peduncles more or less glabrous, eglandular, tomentose. Involucres 9 mm long; involucre bracts lanceolate, obtuse, with scattered (30–35) hairs 1 mm long, eglandular, almost without stellate hairs. Stigmas dark. Flowering July.

Mountain meadows, at 900 m.—*Caucasus*: Ciscaucasia. Endemic. Described from Beshtau Mountain. Type in Leningrad.

Note. It is distinguished from the species of the cycle *Korshinskya* (for example, from *H. leucothyrsoides* Kozl. and Zahn or *H. tephrophilum* Kozl. and Zahn) by having a completely eglandular inflorescence and glabrous leaves.

245. **H. wologdense** Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 143; Zahn in Pflzr. IV, 280, 403.

Perennial. Stem 20–50 cm high, 2 mm in diameter, usually violet below and to moderately covered with soft white hairs 1–3 mm long, eglandular, stellate-hairy more or less throughout. Basal leaves 1–4, elliptical, obtuse to oblong-lanceolate or lanceolate, and subacute or acute, short- or long-tapered toward base to petiole (4.5:1), denticulate or toward base usually coarsely triangular-toothed (tips of teeth subulate), light- or yellowish-green, pubescent on both sides and along margin with hairs 0.6–1.5 mm long, dense pubescence beneath, along midrib and on petioles, with hairs 1.5–2.0 mm long, as a whole densely hairy, sometimes with sparse stellate hairs; cauline leaves 2–4 (coefficient of leafiness 0.09), lanceolate, tapered to base, bottom leaf short-petiolate, others sessile, acuminate, in lower half serrulate (subulately), on both sides and as a whole densely pubescent, always stellate-hairy beneath and sometimes on both sides. Inflorescence paniculate, with 3–6 (according to Zahn 10–20!) capitula; peduncles short-pubescent, sparse to scattered, eglandular, grayish-tomentose. Involucres 8.5–9.5(–10.5) mm long; involucre bracts narrow, acuminate, dark, with sparse to scattered, 30(18–43), light-colored hairs 1.0–1.3 mm long, eglandular or with occasional (0–6) tiny glands 0.2–0.3 mm long, at base quite densely stellate-hairy. Stigmas dark; achenes 4 mm long, blackish. Flowering July to August. (Plate XXVIII, Fig. 1.)

Subalpine zone of Northern Urals.—*European Part*: Dvina-Pechora, Arctic Europe? (Sabel Mountain); *Western Siberia*: Arctic? (Uss). Described from Ust-Shchugor. Type in Leningrad.

246. **H. korshinskyi** Zahn in Pflzr. IV, 280 (1921) 528.—*H. almaatense* B. Fedtsch. and Nevski in Tr. Bot. Inst. Akad. Nauk SSSR, Ser. 1, I (1933) 207.

Perennial. Stem 40(20–75) cm high, 1–3 mm in diameter, violet at base, to scattered-hairy with light-colored hairs 1–3 mm long (more conspicuous at base, solitary above), eglandular, weakly stellate-hairy. Basal leaves 0–7, outer ovate, abruptly narrowed to petiole, inner
220 elliptical or lanceolate, large (to 20 mm long), tapered to long winged petiole (5:1), rounded to acute, finely and slightly toothed or with 3–6, more or less distinct, broad teeth, olive- or bluish-green, paler beneath and often reddish-violet, above, beneath and along margin with scattered hairs 0.5–1.0 mm long, pubescence along midrib beneath and on petioles to dense with hairs 1.5–2.5 mm long, as a whole to moderately, rarely to very densely (var. *abakanum* Juxip) hairy; cauline leaves 3–4(1–7) (coefficient of leafiness 0.08), bottom leaf oblong-lanceolate, tapered to short, winged petiole or sessile, with 4–5 teeth,



very acuminate, others sessile, with narrowed, rounded, or somewhat perfoliate base, sparsely stellate-hairy along midrib beneath. Inflorescence paniculate, with 6(1–12(32)) capitula; peduncles with hairs 1.0–1.5 mm long, solitary to scattered (highly variable), eglandular or with occasional glands 0.1–0.2(0.4) mm long, white-tomentose. Involucres 9(8.0–11.5) mm long; involucre bracts narrowly lanceolate, more or less acute, dark green, with light green border, sparse to scattered, 25(12–45(55)), hairs 1 mm long, light-colored with dark base, eglandular or with occasional, 3(0–13), glands 1–0.3 mm long, sparse to scattered stellate-hairy. Stigmas dark (yellowish brown in var. *abakanum* Juxip). Flowering June to August (September). (Plate XV, Fig. 2.)

Montane spruce-fir forests, turfey gravel beds near and along old stony beds of mountain streams, dry clayey stony mountain slopes, around rocks near lower limit of forest, subalpine meadows, at 1500–2700 m.—*Soviet Central Asia*: Tien Shan, Syr-Darya, Dzhungaria-Tarbagatai; *Western Siberia*: Angara-Sayans, Dauria. *General distribution*: Dzhungaria-Kashgaria. Described from Dzhungarian Alatau. Type in Leningrad.

247. **H. subaquilonare** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1939) 487.

Perennial. Stem 30–60 cm high, 2–5 mm in diameter, flexuous, violet at base, sulcate, to sparsely covered with hairs 1–2 mm long, eglandular (sometimes with lateral stems). Basal leaves 0–7, elliptical to lanceolate, tapered to petiole, acute, with small and larger triangular teeth (to 5), olive-green, violet beneath, with scattered to barely moderate hairs 0.6–1.5 mm long; cauline leaves 2–6 (coefficient of leafiness 0.08), lanceolate, short-petiolate or upper leaves sessile, hardly toothed. Inflorescence paniculate, with 3–8(–28) capitula; peduncles covered with scattered to moderate hairs 1.0–1.5 mm long, eglandular or with occasional glands 0.2–0.3 mm long, tomentose. Involucres 9–11 mm long; involucre bracts linear, obtuse, blackish, with scattered, 35(22–50), hairs 1.0–2.5 mm long, light-colored with dark base and with occasional, 4(0–5), glands 0.3 mm long, more or less without stellate hairs. Stigmas yellowish-brown, later turning dark. Flowering June to August.

Herb and forested mountain slopes and riverbanks, preferably on calcareous soil.—*European Part*: Karelia-Lapland, Dvina-Pechora, Volga-Kama. Endemic. Described from banks of Onega River (Kargopol District). Type in Leningrad.

Note. It is distinguished from the related species of cycle *Korshinskaya* (for example, *H. wolodense* Pohle and Zahn) by having yellowish-brown stigmas and scattered leaf pubescence.

248. **H. leucothyrsoides** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 11; Zahn in Pflzr. IV, 280, 394.

Perennial. Stem 20–60 cm high, 1–3 mm in diameter, to moderately pubescent, thicker below, thinner upward, eglandular, at top stellate-hairy. Basal leaves 2–5, large, ovate or ovate-oblong, toward base abruptly cuneate, with sparse broad teeth, on both sides and as a whole densely short-pubescent; cauline leaves 2–4(–6) (coefficient of leafiness 0.10), remote, bottom leaf large, ovate-oblong, tapered to petiole, others abruptly reduced, short-petiolate, upper leaves sessile, lanceolate, acuminate, to moderately pubescent. Inflorescence openly paniculate, with 2–12 capitula; peduncles sparsely (to scatteredly) short-pilose, with occasional glands 0.2–0.3 mm long, tomentose. Involucres (7–)9–11 mm long, broad; involucre bracts lanceolate, somewhat acute, with scattered, 28(12–36), light-colored hairs 1 mm long and occasional, 2(0–6), glands 0.2–0.3 mm long, with scattered stellate hairs. Stigmas yellowish-brown. Flowering July to August.

Subalpine and alpine meadows, at 1850–2400 m.—*Caucasus*: Eastern and Western Transcaucasia, Dagestan. Endemic. Described from town of Bakuriani. Type in Tbilisi.

249. **H. tephrophilum** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 11; Zahn in Pflzr. IV, 280, 397.

Perennial. Stem 30–50 cm high, 1.0–2.5 mm in diameter, with scattered white hairs 1.5–2.5 mm long, eglandular, densely stellate-hairy, often with lateral stems. Basal leaves often very large, to 20 cm long, outer elliptical, obtuse, others broadly oblong-lanceolate (4.5:1), tapered to petiole, acuminate, from base to middle of leaves with large and often 2–4 long teeth, with hairs 0.3–0.6 mm long on both sides or becoming glabrous above, as a whole scattered-pilose, grayish-green; 224 cauline leaves (2–)3–5 (coefficient of leafiness 0.08), remote, like basal leaves, abruptly reduced, bottom leaf tapered to narrow base, sessile, often long-toothed, others more or less lanceolate, long-acuminate, stellate-hairy beneath along midrib. Inflorescence openly paniculate, with 10–20 capitula; peduncles sparsely white-pubescent, eglandular or with occasional glands 0.2 mm long, white-tomentose. Involucres 9–10 mm long; involucre bracts narrowly lanceolate, acute, with scattered, 24(16–32), white hairs 1 mm long with dark base and occasional, 3(0–8), glands 0.2 mm long, outer bracts densely stellate-hairy along margin. Stigmas dark. Flowering June to August.

On old glacial moraines, at 1900–2000 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from vicinity of town of Bakuriani. Type in Tbilisi.

250. **H. uczanssuense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 487.

Perennial. Stem 30 cm high, 1 mm in diameter, violet at base and to scatteredly white-pilose, hairs 2 mm long, glabrous above, eglandular. One basal leaf at anthesis, lanceolate, tapered to base (6:1), glabrous above, moderately pubescent beneath and along midrib with hairs 1 mm long, with occasional hairs 0.5 mm long along margin, as a whole to scattered-pubescent; cauline leaves 3 (coefficient of leafiness 0.09), lanceolate, narrowed to base, acute, remote, gradually reduced, pubescence as in basal leaves. Inflorescence strongly dichotomous, with 3 capitula; peduncles glabrous, eglandular, tomentose. Involucres 8 mm long; involucre bracts narrow, acute, to sparsely (16) pubescent with hairs 1 mm long, with occasional (5) glands 0.4 mm long, more or less without stellate hairs. Stigmas dark. Flowering July.

European Part: Crimea (between Uchan-Su and Ai-Petri, collected by O. Fedtschenko and B. Fedtschenko, 2.VIII.1893). Endemic. Described from Uchan-Su. Type in Leningrad.

Note. This unique specimen of the species is at the same time the only representative of subsection *Laevicaulia* (and *Vulgata*) from Crimea.

It is distinguished from the closely related species of this cycle by the comparatively lower coefficient of leafiness (0.09) and the cauline leaves that are narrowed toward the base.

251. **H. aczelmanicum** Schischk. and Serg. in Sistem, Zam. po Mat. Gerb. im. Krylova pri Tomsk. Univ. 1-2 (1949) 19; Krylov, Fl. Zap. Sib. XI, 3054.

Perennial. Stem 40-60 cm high, to 3 mm in diameter, with light-colored hairs 2-4 mm long throughout, denser below with retrorse hairs, hairs reduced and horizontally spreading above, eglandular, with scattered stellate hairs at top. Basal leaves 0-1, obovate, tapered to short petiole, rounded-obtuse, unevenly toothed, pubescent; cauline
 225 leaves to 6 (coefficient of leafiness 0.10-0.15), bottom leaves (3-4) oval to ovate, to 8 cm long, quite broad (2:1), sessile, with broad semiamplexicaul base, obtuse, with 5-7 unequal teeth, larger toward base of leaf, upper smaller, cuneate, acute, all leaves scattered-pubescent but along margin conspicuously pubescent, green, paler beneath. Inflorescence open remote panicle, with 2-10 capitula; peduncles covered with sparse to scattered, light-colored hairs to 2 mm long and with very few short glands, scattered stellate hairs. Involucres 10 mm long; involucre bracts narrow, subacute, with light border, with scattered, 40(36-42), light-colored hairs 2 mm long and occasional, 3(0-6), glands 0.1-0.2 mm long or eglandular, to moderately stellate-hairy. Corollas yellow; stigmas dark; achenes reddish-black. Flowering July.

Forests.—*Western Siberia*: Altai. Endemic. Described from banks of Achelman River. Type in Tomsk.

252. **H. sarykamyschense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 487.

Perennial. Stem 80 cm high, 3.5 mm in diameter, sparsely pubescent, eglandular, sometimes two stems arising from single rhizome. Basal leaves 2–3, lanceolate, outer small, acute to spatulate, inner large (25 cm long), 5:1, somewhat obtuse, strongly tapered to long petiole, glaucescent, with 4–5 remote small teeth and occasional hairs near and along margin, along midrib beneath and as a whole sparsely hairy with hairs 1.0–2.5 mm long; cauline leaves 7 (coefficient of leafiness 0.09), lanceolate, evenly distributed, lower large, gradually reduced, with rounded, semiamplexicaul base, acuminate, with 2–5 acute teeth, of which 1–2 pairs larger, subglabrous (at first glance leaves appear glabrous.) Inflorescence paniculate, with 10 capitula; peduncles with occasional hairs 1 mm long and glands 0.2 mm long, grayish-tomentose. Involucres 9 mm long; involucral bracts lanceolate, obtuse with sparse (21–26), hairs 1 mm long and occasional (6–12) glands 0.1–0.2 mm long, more or less without stellate hairs. Stigmas dark. (Plate XVIII, Fig. 2.)

Montane pine forests.—*Caucasus*: Possibly found in Southern Transcaucasia. *General distribution*: Eastern Anatolia. Described from vicinity of Sarykamys (former Kars Region). Type in Leningrad.

Note. It is distinguished from the closely related Caucasian species of *Korshinskaya* by broad semiamplexicaul leaves.

Cycle 3. Trita Juxip.—Number of hairs on involucral bracts many times greater than number of glands; plants with low coefficient of leafiness.

253. **H. gudissiense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 488.

Perennial. Stem 30 cm high, 2 mm in diameter, to scattered-hairy with hairs 3 mm long, more conspicuous at base, eglandular. Basal leaves 4, lanceolate, abruptly narrowed to petiole, more or less entire, broad (3:1), moderately hairy on both sides and along margin, but densely hairy along midrib beneath with hairs 1.0–1.5 mm long, as a whole to moderately hairy; cauline leaves 1 (coefficient of leafiness 0.04), broadly lanceolate (2.7:1). Inflorescence dichotomously paniculate, with 4 capitula; peduncles sparsely pubescent, more or less eglandular, tomentose. Involucres 12.5 mm long; involucral bracts linear, subacute, to moderately (52) covered with short light-colored hairs

0.7 mm long with dark base and few (7), glands 0.2–0.3 mm long, stellate-hairy at base and along margin. Stigmas dark. Flowering July.

Subalpine meadows.—*Caucasus*: Western Transcaucasia. Endemic. Described from southern Ossetia (Gudis ravine). Type in Leningrad.

Note. It is distinguished from the closely related Caucasian species of *Trita* by large (12.5 mm long) involucre.

254. **H. sershukense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 488.

Perennial. Stem 22–32 cm high, 1.0–1.5 mm in diameter, to sparsely pubescent, eglandular. Basal leaves 1–3, lanceolate, tapered to petiole, scarcely denticulate, to scattered short-pubescent; cauline leaves 1–2 (coefficient of leafiness 0.05), lanceolate, scarcely toothed, upper leaf bracteiform. Inflorescence paniculate, of 3–6 capitula; peduncles with sparse hairs and occasional glands, tomentose. Involucre 9 mm long; involucre bracts narrow, acute, to scattered-pubescent (34), with hairs 1 mm long and few (2) glands 0.2 mm long, more or less without stellate hairs. Stigmas yellowish-brown. Flowering July.

Open mountain slopes.—*Western Siberia*: Altai. Endemic. Described from valley of Serzhuka River (Zmeinogorsk District). Type in Leningrad.

Note. It is distinguished from *M. korshinskyi* Zahn by the yellow stigmas.

255. **H. tritum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 489.—*H. striaticeps* Zahn in Pflzr. IV, 280 (1921) 394; quoad pl. Vologd. non Dahlst.

Perennial. Stem 45(20–90) cm high, 0.5–3.0 mm in diameter, usually sparsely, at base more densely pubescent, eglandular, vigorous specimens often branching. Basal leaves 3–4(1–7), to 20 mm long, 5:1, elliptical to lanceolate, tapered to long, winged petiole, denticulate, glaucous, sparsely hairy above, scatteredly beneath, moderately along margin, but to densely along midrib beneath, hairs 1.5 mm long, as a whole moderately hairy; cauline leaves 2–3(1–5) (coefficient of leafiness 0.06), lanceolate, bottom leaf short-petiolate, others sessile, acute, pubescent like basal leaves, stellate-hairy along midrib beneath. Inflorescence openly paniculate, with 2–18(–70) capitula; peduncles glabrous or with occasional, short hairs 0.6–1.0 mm long, eglandular or
227 with occasional glands 0.2–0.3 mm long, more or less tomentose. Involucre 8–11 mm long; involucre bracts broad, lanceolate, sub-acute, sparsely, 23(14–43), hairy with hairs 1 mm long, with occasional, 5(0–12), glands 0.2–0.3 mm long (visible in incident light under strong magnifying glass!); more or less without stellate hairs or densely hairy

(var. *tritiforme* Juxip). Stigmas dark or yellowish-brown (in the variety always yellow). Flowering June to July.

Stony slopes along banks of rivers and lakes, subalpine birch forests, pine forests on ridges, pine-spruce forests, and along edges of pine-birch forests.—*European Part*: Arctic Europe (Urals), Karelia-Lapland, Dvina-Pechora, Volga-Kama, Lodga-Ilmen, Baltic Region; *Western Siberia*: Ob' Region (Urals). Described from Estonian SSR. Type in Tartu.

Note. Extensive material of this species had already been partly determined by Dahlstedt, Lindberg, Norrlin, Samuelsson, and Zahn, who called the plant at times *H. vulgatum* Fr., at other times *H. triviale* Norrl. We studied all the available material again and found that: 1) *H. triviale* Norrl. is a synonym of *H. vulgatum* Fr.; and 2) here two morphologically different types had been combined: one type, in which the number of hairs on the involucre bracts was many times more than the number of tiny (0.2–0.3 mm long) glands on those very bracts, and the other type, where the number of hairs and glands was more or less equal, but the glands were 0.4–0.6 mm long.

In the light of these facts, we considered it better to segregate the first type under the name *H. tritum* Juxip and to retain the old name *H. vulgatum* for the second type, subordinating *H. triviale* Norrl. to it as a synonym.

256. ***H. karjaginii*** Juxip in Bot. Mat. Gerb. Bot. Inst. XIX (1959) 489.

Perennial. Stem to 50 cm high, 2.5 mm in diameter, more or less sparsely pubescent, more conspicuously at base, eglandular, with very sparse down. Basal leaves (3–4) to 20 mm long (4:1), elliptical to lanceolate, tapered to fairly long petiole, more or less denticulate, glaucescent, on both sides sparsely pubescent (hairs 1 mm long), densely along midrib beneath (hairs 1.5 mm long), but sparsely along margin, scattered pubescent (hairs 1 mm long), as a whole scattered-pubescent, without stellate hairs; cauline leaves 1–2, lanceolate, long-petiolate, with 3–4 conspicuously acute teeth, pubescence to scattered (glabrous above), with weak down along midrib beneath. Inflorescence paniculate-corymbose, with 8 capitula, in part undeveloped; peduncles with scattered hairs 1 mm long, and occasional fine glands 0.2 mm long, tomentose. Involucres 10–11 mm long; involucre bracts narrow, acute, to scattered-pubescent (28) (hairs 1 mm long), with dark base and light-colored tips, with occasional (5) fine glands 0.2–0.3 mm long, sparsely stellate-hairy. Stigmas yellow. Flowering June.

Caucasus: Azerbaidzhan, Lake Gei-Gyol, 16.VI.1939 (Herbarium of Institute of Botany, Academy of Sciences of Azerbaidzhan SSR in Baku).

- 228 **Note.** It is distinguished from *H. tritum* Juxip by having the peduncles covered with hairs and glands in more or less considerable number.

257. **H. praetervisum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 490.

Perennial. Stem up to 80 cm high, 2.5 mm in diameter, sparsely pubescent in lower part, glabrous and eglandular above. Basal leaves 1–2, elliptical, tapered to long petiole, sharply serrate, without hairs above, densely pubescent beneath along margin and midrib; cauline leaves 4–5 (coefficient of leafiness 0.06), evenly distributed, large, broadly lanceolate (4:1), deeply sharp-serrate, incised, at base more or less lobate, often with free teeth on petiole, olive-green, violet, pubescence to barely moderate (almost half as hairy as basal leaves). Inflorescence openly paniculate, with 20 capitula; peduncles almost glabrous, eglandular, tomentose. Involucres 10 mm long; involucral bracts with scattered, 37(34–40), short pubescence with hairs 0.6 mm long, with occasional, 9(6–12) glands 0.3 mm long, more or less without stellate hairs. Stigmas dark. Flowering July.

Edges of spruce forests on calcareous stony soil.—*European Part:* Baltic Region (Estonian SSR). Endemic. Described from Varbol (north-western part of Estonian SSR). Type in Tartu.

Note. The species is very close to *H. tritum* Juxip; distinguished by the cauline leaves that are deeply incised and glabrous above.

258. **H. borodinianum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 490.

Perennial. Stem 25–80 cm high, 1–3 mm in diameter, pubescence to scattered, with hairs 2–3 mm long (more conspicuous at violet base), eglandular, weakly stellate-hairy above. Basal leaves 2–6, lanceolate, tapered to long petiole, to 17 cm long (5:1), with 4–6 small or more or less sharp, deep teeth (one short teeth between two long), to densely hairy on both sides with hairs 0.5–1.0 mm long, moderately hairy along margin, densely along midrib beneath, as a whole, to densely hairy, light grass-green, reddish-violet beneath; cauline leaves 2–4(–7) (coefficient of leafiness 0.06), lanceolate, lowermost leaf petiolate, others sessile, with 4–5 teeth, acute, pubescence density as in basal leaves. Inflorescence paniculate-umbelliform, with 3–4 capitula; peduncles to sparsely pubescent, eglandular, tomentose. Involucres 8.5–10.5 mm long; involucral bracts acute, to scattered-pubescent, 36(24–44), with hairs 1 mm long, with scattered glands, 13(18–23), 0.3–0.4 mm long, usually without stellate hairs. Stigmas yellowish-brown or dull green. Flowering July to August. (Plate XXII.)

Spruce-birch forests, on hills.—*European Part*: Ladoga-Ilmen, Upper Volga, Upper Dnieper. Endemic. Described from Staritsa District (Kalinin Region). Type in Leningrad.

229 **Note.** It is distinguished from the closely related species *H. praetervisum* Juxip by having the leaves densely pubescent on both sides and yellowish-brown or dull green stigmas.

Cycle 4. Membranulata Juxip.—Hairs and glands in inflorescence more or less equal in number; coefficient of leafiness more or less high (0.20–0.13).

259. **H. subviolascensiforme** Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 142; Zahn in Pflzr. IV, 280.

Perennial. Stem to 20 cm high, 1 mm in diameter, only at base somewhat hairy, stellate-hairy. Basal leaves short-petiolate, oblong-lanceolate, acute, serrate; cauline leaves 3–5 (coefficient of leafiness 0.20), narrowly lanceolate, acute, short-petiolate or attenuate-sessile, upper subulate, serrate, more or less glabrous above, scattered-hairy beneath, moderate along margins and midrib (hairs 1–2 mm long), light green, more or less purple. Inflorescence paniculate, with 1–5 capitula; peduncles sparsely pubescent and glandular, gray-tomentose. Involucres 9 mm long, ovate, later transversely compressed; involucre bracts somewhat broad and obtuse, with broad border, sparsely pubescent with hairs 1 mm long, sparsely glandular, with scattered-stellate hairs only dorsally. Stigmas dark. Flowering July.

On limestone rocks.—*European Part*: Arctic Europe, Dvina-Pechora; *Western Siberia*. Endemic. Described from banks of Usa River (tributary of Pechora River). Type unknown.

260. **H. membranulatum** Litw. and Zahn in Fedde, Repert. IV (1907) 239; Zahn in Pflzr. IV, 280, 383.

Perennial. Stem 30–40 cm high, 1.0–1.5 mm in diameter, violet at base, more or less glabrous. Basal leaves 0–3(–7), elliptical, oblong and somewhat obtuse to oblong-lanceolate, to 16 cm long (5.5:1), tapered to short or long petiole, acute, toothed from base to middle of lamina, with large unequal triangular teeth, entire toward tip, light green, pale beneath, glabrous above, as a whole very weakly pubescent with short hairs 1 mm long; cauline leaves (3–)4–5 (coefficient of leafiness 0.13), lanceolate, petiolate, gradually reduced, upper sessile, acute, somewhat stellate-hairy beneath. Inflorescence paniculate, with 2–3(–10) capitula; peduncles (almost) without simple hairs and glands, scattered-tomentose. Involucres 9.0–9.5 mm long, ovate; involucre bracts lanceolate, somewhat broad and obtuse, dark green, with pale borders,

pubescence to sparse (16–21), with hairs 1 mm long and occasional (10–16) glands 0.3–0.5 mm long, more or less without stellate hairs. Stigmas dark or dull green. Flowering July to August.

230 Montane pine and birch forests, at 1260 m and above.—*Caucasus*: Dagestan, Western Transcaucasia. Endemic. Described from Teberda, variety from Dagestan (Richa). Type in Leningrad.

Note. In Dagestan, variety *riczaense* Juxip is found, which is distinguished by the somewhat heavier pubescence of the whole plant.

Cycle 5. Vulgatiformia Juxip.—Number of hairs and glands in inflorescence more or less equal; coefficient of leafiness medium (0.10–0.08); glands medium to large (0.4–1.0 mm long).

261. **H. agronesacum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 491.

Perennial. Stem 55–95 cm high, 2–3 mm in diameter, sparsely pubescent, eglandular. Basal leaves 1–3, elliptical to lanceolate, to 16 mm long (4.5:1), with very fine short teeth, on both sides and as a whole with scattered short hairs 0.8–1.5 mm long; cauline leaves 5–8 (coefficient of leafiness 0.08), evenly distributed on up to two-thirds of stem, lanceolate, with 4–5 short teeth, olive- or glaucescent, pubescence as in basal leaves. Inflorescence paniculate, with 4–15 capitula; peduncles with occasional hairs and glands, with scattered stellate hairs. Involucres 10.5–11.5 mm long; involucre bracts with sparse, 21(19–24), hairs 1.2 mm long and occasional (10) glands 0.3 mm long, more or less without stellate hairs. Stigmas dark. Flowering July.

Forest edges.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from vicinity of Tartu. Type in Tartu.

Note. It is distinguished from the closely related species *H. schischkinii* Juxip by having very weakly toothed leaves and large involucre.

262. **H. schischkinii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 491.

Perennial. Stem 50–70 cm high, 2.5–3.5 mm in diameter, violet at base, sulcate, pubescence to sparse, eglandular, with sparse stellate hairs above. Basal leaves 3–4, broadly lanceolate, quite abruptly narrowed to long, winged petiole, acuminate, lamina from base to middle deeply incised, with 6–9 acute teeth, and with free teeth on petioles, denticulate at tip, grassy green or glaucescent, sparsely hairy above with small hairs, 0.3–0.5 mm long, moderately pubescent beneath with hairs 1.0–1.5 mm long, scattered along margin, with dense hairs 2 mm long along midrib beneath, as a whole pubescence to moderate;

cauline leaves 5–6 (coefficient of leafiness 0.09), like inner basal leaves, lanceolate, bottom leaf short-petiolate, others sessile, deeply incised-toothed, acute. Inflorescence paniculate-umbelliform, with 20 capitula; peduncles scattered-hairy (conspicuously) with hairs 1 mm long, eglandular or with occasional glands, 0.2 mm long, more or less densely tomentose. Involucres 9.5–10.0 mm long; involucre bracts linear-lanceolate, narrow, acute, with scattered, 34(20–45), hairs 1.0–1.5 mm long and few to sparse, 15(8–20), glands 0.2–0.3 mm long, more or less without stellate hairs. Stigmas yellowish-brown or dark. Flowering June to July. (Plate XXIII, Fig. 1.)

Meadows and forest edges.—*Western Siberia*: Ob' Region. Endemic. Described from vicinity of Biisk. Type in Leningrad.

Note. Close to *H. ganeschinskii* Zahn, it is distinguished by having a larger number of cauline leaves and capitula and deeply incised leaves. From *H. korshinskyi* Zahn, it is distinguished by having a higher number of glands on the involucre bracts and by leaf shape.

263. ***H. falcidentatum*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 492.

Perennial. Stems 70–75 cm high, to 3 mm in diameter, scatteredly pubescent below, eglandular, branching above. Basal leaves 5–9, in well-developed rosette (not typical for this subsection!), to 17 cm long (6–7:1), narrowly lanceolate, tapered to long, winged petiole, unequally acuminate, with acute or falcate recurved teeth, with free teeth on petioles, olive-green or slightly violet, with occasional hairs above, sparse beneath, moderate along margin, dense along midrib beneath and on petioles, with hairs 0.7–1.5 mm long, as a whole moderately hairy; cauline leaves 5–7 (coefficient of leafiness 0.08), evenly distributed, narrowly lanceolate (7.5:1), sharply toothed. Inflorescence paniculate, with 14–25 capitula, in part undeveloped; peduncles to sparsely hairy with hairs 1 mm long, eglandular or with occasional glands, weakly tomentose. Involucres 7.5–9.5 mm long; involucre bracts lanceolate, somewhat obtuse, sparsely, 22(17–27), hairy with hairs 1 mm long and with a few, 20(11–28), glands, 0.4 mm long, without stellate hairs. Stigmas dull green; anthers with developed pollen. Flowering July.

Edges of open deciduous forests, on calcareous, stony, dry soil.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from vicinity of Rapla. Type in Tartu.

Note. The species is remarkable for its well developed rosette of narrow basal leaves with falcately sharp teeth and developed pollen. These features distinguish it from the closely related *H. vulgatiforme* Dahlst.

264. **H. vulgatiforme** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl, III (1894) 81; Norrl. in Mela-Cajander, Suom. Kasvio, 716; Zahn in Pflzr. IV, 280, 404; Joh. and Sam. Dalarn. Hier. Vulgatif. (1923) 75; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 627; Zahn in Asch. and Graebn. Synopsis, XII, II, 711; nec Arv.-Touv. (1876).—**Exs.:** Dahlst. Hier. exs. fasc. 11, No. 93; Dahlst., Herb. Hier. Scand., cent. II, Nos. 91, 92, V, No. 62, XIV, No. 53, XXIV, No. 74.

- 232 Perennial. Stem 40–90 cm high, 1.5–4.5 mm in diameter, reddish-violet at base, with occasional hairs or to scattered-pubescent at base, eglandular, vigorous specimens often branching. Basal leaves 3(0–6), elliptical, ovate to oblong-lanceolate tapered to winged petiole, often large (to 21 cm long) (5–6:1), almost entire or with remote, short, serrate teeth, dark green, paler beneath, partly withreing before anthesis, sparsely hairy above with hairs 0.7–2.0 mm long, to moderately hairy beneath and along margin, scattered-pubescent along midrib beneath and on petioles, as a whole to moderately hairy with hairs 1.5–3.0 mm long; cauline leaves 6–7(4–10) (coefficient of leafiness on average 0.10), evenly distributed, oblong-lanceolate, bottom leaves tapered to petiole, upper sessile, with 3–4 remote teeth, pubescence as in basal leaves. Inflorescence openly paniculate, with 3–28 capitula; peduncles glabrous or to sparsely hairy (this character is subject to great variation), with few to sparse glands 0.3–0.5 mm long, tomentose. Involucres (8.5)9.0–11.5 mm long, ovate, later truncate; involucral bracts lanceolate, broad, somewhat obtuse to subacute, with colored tips, sparsely covered, 20(12–33), with light-colored hairs 1.0–1.5 mm long having dark base, sparse to scattered, 25(15–40), glands 0.4–0.5 mm long, but sometimes glands large, 0.8–1.0 mm long (var. *ostiense* Juxip), more or less without stellate hairs. Stigmas yellowish-brown or rusty, later turning dark. Flowering July to August.

Open pine-spruce (sand-dune) forests, oak-groves, evidently preferring vicinity of sea.—*European Part:* Ladoga-Ilmen, Upper Volga, Baltic Region. *General distribution:* Scandinavia, Central Europe. Described from Sweden. Type in Stockholm.

Note. This species is very close to *H. tyrsiflorum* Norrl., which has been found (according to Norrlin) on the Solovetsk Islands. In any case, based on Norrlin's very brief diagnosis, it is impossible to separate it from *H. vulgatiforme* (Norrl. in Mela-Cajander, *Suom. Kasvio*, 718; Zahn in Pflzr. IV, 280, 104 (nota)). Since we did not see the authentic specimen, we have decided not to treat it as a synonym of *H. vulgatiforme*.

265. **H. guderghiense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 492.



Perennial. Stem 35–55 cm high, 2.5 mm in diameter, violet at base and with up to scattered hairs 2.5 mm long, with occasional hairs above, eglandular. Basal leaves 2–3(0–4), lanceolate, tapered to petiole, acute, scarcely denticulate, gray-green, as a whole to scatteredly
 235 hairy with hairs 0.5–1.5 mm long; cauline leaves 4 (coefficient of leafiness 0.09), lanceolate, upper linear, bracteiform. Inflorescence paniculate, with 4–7 capitula; peduncles with occasional to sparse hairs and few glands, tomentose. Involucres 11–12 mm long; involucre bracts narrow, acute, to sparsely (20) hairy with hairs 1 mm long, with scattered, 32(26–37), glands 1 mm long, stellate hairs at base and along margin, glabrous beneath. Stigmas dark, ligule teeth somewhat ciliate. Flowering June to July.

Subalpine meadows.—*Caucasus*: Ciscaucasia, Western Transcaucasia. Endemic. Described from Southern Ossetia (Gudergomi). Type in Leningrad.

Note. It replaces *H. vulgatiforme* Dahlst. in Caucasus, from which it is distinguished only by its dark stigmas.

Cycle 6. Constringentia Juxip.—Number of hairs and glands on involucre bracts more or less equal; glands on inflorescence sparse; coefficient of leafiness low (0.07–0.04).

266. **H. constringensiforme** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 492.

Perennial. Stem 20–50 cm high, 1–3 mm in diameter, with scattered hairs 1–2 mm long (more conspicuous at base of stem), eglandular, stellate-hairy above. Basal leaves 2–8, oval to lanceolate, more or less abruptly tapered to petiole, weakly denticulate with 3–5 teeth, or more or less entire, acute, moderately to densely hairy on both sides and along margin with hairs 0.3–1.0 mm long, with dense hairs 1.5 mm long beneath on midrib, as a whole pubescence to dense, grassy- or glaucescent-green; cauline leaves 2–3 (coefficient of leafiness 0.06), narrowly lanceolate, scarcely toothed with 3–5 teeth, more conspicuous at base and sometimes extending onto petiole. Inflorescence strongly dichotomously paniculate, often one-sided, with 2–12(–25) capitula; peduncles scatteredly hairy with hairs 1.0–1.5 mm long, with occasional glands 0.2–0.4 mm long, tomentose. Involucres 8.5–10 mm long; involucre bracts acute, pubescence to scattered, 30(20–37), with hairs 1 mm long, with few (to sparse), 14(8–23), glands 0.2–0.4 mm long, sparsely stellate-hairy. Stigmas dark; florets often tubular. Flowering July to August.

Sandy banks of rivers and lakes, outcrops of marl, slate and limestone.—*Arctic*: Arctic Europe (Urals); *European Part*: Karelia-Lapland,

Dvina-Pechora; *Western Siberia*: Ob' Region. Endemic. Described from basin of Severnaya Sosva River (Berezvoka District). Type in Leningrad.

Note. The species is close to *H. constringens* Norrl. but is distinguished from it by having smaller involucre and pubescence that is twice as dense on the leaves and stem. (*H. constringens* Norrl. is a Scandinavian species which has spread eastward to the Åland Islands.)

- 236 267. **H. coniops** Norrl. Herb. Mus. Fenn. ed. 2 (1889) 150; Brenner. Finnl. Hier.-form. II, 21; Norrl. in Mela-Cajander, Suom. Kasvio, 714; Zahn in Pflzr. IV, 280, 466; Samuelsson, Maps of Scand. Hier. sp. No. 82.—*H. umbricola* Sael. apud Norrl. Herb. Mus. Fenn. ed. 2 (1889) 150; Norrl. in Mela-Cajander, Suom. Kasvio. 715; Zahn in Pflzr. IV, 280, 465; Joh. and Sam. Dalarn. Hier. Vulgatif. 74; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 621.—*H. torpense* Dahlst. ex K. Joh. Arch. Siljanstr. (1902) 66 (cum descr.).—**Exs.:** Norrl. Hier. exs fasc. VIII, Nos. 40, 41; Dahlst. Hier. exs. cent. I, No. 79; Hier. Scand. cent. II, Nos. 50, 51 (sub *H. subtorpense* Dahlst.).

Perennial. Stem 20–55 cm high, 1–4 mm in diameter, violet at base, sulcate, glabrous (almost), eglandular. Basal leaves 3–7, short-tapered to petiole, lanceolate, acute, denticulate or more or less serrate (with 5–10 teeth), or more or less incised, with deep, remote, acute teeth (var. *pandans* Norrl.), to 16 cm long (4–5:1), glabrous above, to scattered-hairy beneath and along margin with hairs 1.0–1.5 mm long, densely hairy on midrib beneath with hairs 1.5–2.0 mm long, as a whole to scattered-hairy, stellate-hairy along midrib beneath; cauline leaves 1–4 (coefficient of leafiness 0.05), lanceolate, toothed, tapered to base, upper ones narrowly lanceolate, entire, stellate-hairy beneath. Inflorescence paniculate, with 2–17 capitula (if more, then inflorescence branched, with branches from axils of all cauline leaves); peduncles (almost) glabrous (hairs 1 mm long), more or less eglandular, grayish-tomentose. Involucre 10–12 mm long, with turbinate base; involucre bracts narrow, subobtusate or acute, pubescence to sparse, 22(12–25(45)), with hairs 1 mm long and few to sparse, 13(6–18), glands 0.3–0.5 mm long, more or less stellate-hairy (near base), barbate at tip. Ligules short; stigmas dark (brown). Flowering July.

Limestone hills, open areas, pine-birch and flood-plain forests.—*European Part:* Karelia-Lapland, Dvina-Pechora, Ladoga-Ilmen (northern part). *General distribution:* Scandinavia. Described from Finland. Type in Helsinki.

268. **H. amblylobum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 493.

Perennial. Stem 80–100 cm high, to 2.5 mm in diameter, with occasional hairs, eglandular (subglabrous). Basal leaves 1–2, large (to 26 cm long), elliptical to lanceolate, narrowed to long petiole, remotely denticulate, glaucescent, grayish-blue beneath, subglabrous above, pubescent beneath and along margin, and as whole to sparse hairs, 0.4–1.0 mm long, cauline leaves 4–5 (coefficient of leafiness 0.05), bottom leaf petiolate, others short-petiolate, upper sessile, lanceolate, toothed, broad (to 4:1), pubescence as in basal leaves. Inflorescence paniculate, with 8–52 capitula; peduncles with occasional hairs and
237 glands, with scattered stellate hairs. Involucres 7.5–8.0 mm long; involucre bracts lanceolate, very blunt, pubescence to sparse, 14(11–15), with hairs 1.2 mm long and equally, 11(8–14), glandular, glands 0.3 mm long, more or less without stellate hairs. Stigmas dark. Flowering July.

Forest edges.—*European Part*: Baltic Region. Described from Talzen (Latvian SSR). Type in Riga.

Note. In habit it resembles *H. vulgatiforme* Dahlst. but is distinguished by the shape of the leaves, obtuse involucre bracts, and sparsely glandular inflorescence, as well as by the sparsely pubescent leaves, which look glabrous at first glance.

269. **H. lepiduliforme** Dahlst. Beitr. Hier.-Fl. Oesels (1901) 42; Zahn in Pflzr. IV, 280, 379; Asch. and Graebn. Synopsis, XII, II, 569.—**IC.**: Dahlst. op. cit. t. VII. fig. 2.

Perennial. Stem 30–70 cm high, 1–3 mm in diameter, reddish at base, with occasional hairs, eglandular, at first glance appearing glabrous. Basal leaves at anthesis 2–3(–4), elliptical to lanceolate, outer obtuse, others acute, tapered to long, winged petiole, to 16 cm long, finely sharply toothed with 1–3 pairs of somewhat larger teeth intermixed, or more or less entire (var. *integrius* Dahlst in Sch.), sparsely covered on both sides with short hairs 0.5–0.1 mm long, moderately so along margin, densely hairy beneath along midrib, with hairs 1.5 mm long, as a whole scattered-hairy; cauline leaves 3–4(1–6) (coefficient of leafiness 0.06), lanceolate, bottom leaf tapered to short, winged petiole, others sessile, at base often toothed with long, sharp teeth, upper half entire, pubescence as in basal leaves. Inflorescence paniculate, with 2–9 capitula; peduncles glabrous (or with occasional hairs), eglandular, weakly tomentose. Involucres (8–)9–10 mm long, ovate, later truncate; involucre bracts linear, more or less obtuse to acute, dark green, with reddish, barbate tip, with few, 8(2–11), hairs 0.8 mm

long and few, 10(8–17), glands 0.3 mm long, more or less without stellate hairs. Stigmas yellow, later turning brown. Flowering July.

Open deciduous forests.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Saaremaa Island (Oesel). Type in Stockholm; cotype in Riga.

Cycle 7. Vulgata Juxip.—Hairs and glands on involucre bracts more or less equal in number; glands medium length (0.4–0.6 mm long), glands in inflorescence to scattered; coefficient of leafiness low (0.07–0.04).

270. **H. prolatatum** K. Joh. ex Dahlst. Bot. of the Faeroes, II (1903) 635 (nota); Zahn in Pflzr. IV, 280, 466 (nota).

238 Perennial. Stem 40–75 cm high, 1.5–3.5 mm in diameter, sparsely pubescent below, eglandular. Basal leaves 2–7, broadly ovate, elliptical to broadly lanceolate (4:1), to 17 cm long, finely (spinously), rarely clearly toothed, olive- or grass-green, sparsely hairy above, scatteredly beneath, moderately along margin, densely so along midrib beneath, but as a whole moderately hairy, with hairs 1.0–1.5 mm long; cauline leaves (1–)2(–3) (coefficient of leafiness 0.04), broadly lanceolate (3.5:1), short-petiolate or sessile. Inflorescence corymbose-paniculate, with 4–18(–30) capitula; peduncles with occasional hairs and glands, tomentose. Involucres 9–11 mm long; involucre bracts broad (1.5 mm), somewhat obtuse, with scattered, 35(20–48), hairs 1.5 mm long, sparsely, 18(6–30), glandular glands 0.2–0.5 mm long, without stellate hairs, barbate at tip. Stigmas dark. Flowering July.

Forest edges and open forests, preferring calcareous soil.—*European Part*: Dvina-Pechora, Ladoga-Ilmen, Baltic Region. *General distribution*: Scandinavia, Atlantic Europe. Described from Faeroe Islands. Type unknown.

Note. Among mainly pollenless specimens we also find specimens with developed pollen.

271. **H. ganeschinii** Zahn in Tr. Pochv.-bot. E'ksp. Perecel, Upr. II, 5 (1912) 151; em. Juxip.

Perennial. Stem 25–65 cm high, 1–3 mm in diameter, to scattered-hairy with hairs 1.0–2.5 mm long, eglandular. Basal leaves 3(1–6), elliptical to broadly lanceolate (4–6:1), to 20 cm long, narrowed to petiole, acuminate, remotely sinuate and irregularly toothed with 3–8 teeth, often with free teeth on petioles, grass-green, paler beneath, moderately pubescent above and along margin, with hairs 0.5–1.0 mm long, densely hairy beneath, particularly along midrib, with hairs 1.0–1.5 mm long, as a whole pubescence to dense; cauline leaves

2–3(1–4) (coefficient of leafiness 0.07), bottom leaf in appearance and pubescence like inner basal leaves, petiolate, upper sessile, usually somewhat stellate-hairy beneath. Inflorescence paniculate with (1–)2–10 capitula; peduncles sparsely to scatteredly hairy with hairs 1.0–1.5 mm long, with occasional glands 0.2 mm long, grayish-tomentose. Involucres (7–)8.0–10.5 mm long, ovate; involucre bracts narrow, subacute, dark, to scattered-hairy, 28(20–40), hairs 1 mm long, with sparse, 15(7–29), or moderate (45–70) glands (var. *jamarovense* Juxip) 0.1–0.4 mm long, stellate-hairy along margin. Stigmas dark, sometimes (rarely) yellowish-brown (var. *karakolense* Juxip.) Flowering July to August.

Aspen-birch, pine-larch and fir-cedar forests, banks of rivers and lakes, subalpine meadows, to 2000 m.—*Western Siberia*: Altai; *Eastern Siberia*: Angara-Sayans, Dauria, Lena-Kolyma. Endemic. Described from Balagan District (Irkutsk Region). Type in Leningrad.

- 239 272. **H. teplouchovii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 493.

Perennial. Stem 25–45 cm high, 1–3 mm in diameter, violet at base, covered up to scattered with hairs 1.5–2.5 mm long, eglandular, densely stellate-hairy above. Basal leaves 2–5, elliptical to broadly lanceolate (4.5:1); abruptly or gradually tapered to slender petiole, obtuse to subacute, more or less entire or with spinose teeth, grass-green, glaucous beneath, with scattered hairs 1 mm long above, densely hairy beneath with hairs 2.0–2.5 mm long, along margin, very densely hairy along midrib beneath with hairs 2.0–2.5 mm long, as a whole densely hairy; cauline leaves (1–)2–5 (coefficient of leafiness 0.07), lanceolate, bottom leaf quite abruptly tapered to petiole, upper sessile with tapered base, acute, pubescence as in basal leaves. Inflorescence paniculate with 2–6 capitula; peduncles with occasional hairs 1 mm long and sparse to scattered glands 0.2–0.6 mm long, tomentose. Involucres 9.5–11.0 mm long; involucre bracts lanceolate, acute to scattered-hairy, 28(20–33), with hairs 1.5 mm long, equally, 30(18–42), glandular, with glands 0.4–1.0 mm long, somewhat stellate-hairy at base and along margin. Stigmas dark; anthers in some specimens with sterile pollen. Flowering July to August. (Plate XXIV, Fig. 1.)

Slopes of volcanic mounds in montane spruce and spruce-fir forests.—*Arctic*: Arctic Europe (Kanin); *European Part*: Volga-Kama (Urals); *Western Siberia*: Ob' Region (Urals). Described from Perm Region. Type in Leningrad.

Note. It is distinguished from the closely related *H. vulgatum* (Fr.) Almqu. by having pubescence on the leaves that is twice as dense.

273. **H. acroleucum** Stenstr. Varml. Arch. (1889) 55; Dahlst. Bidr. Sydostr. Sverig. Hier.-Fl. III, 69; Zahn in Pflzr. IV, 280, 392; Joh. and

Sam. Dalarn. Hier. Vulgatif. 10; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 626; Asch. and Graebn. Synopsis, XII, II, 701; Samuelsson, Maps of Scand. Hier. sp. No. 70.—**Exs.:** Dahlst. Hier. exs. fasc. II, No. 60, III, No. 46; Hier. Scand. II, Nos. 75, 76; GRF No. 1849b.

240 Perennial. Stem 30–75 cm high, 3–4 mm in diameter, violet at base and sparsely covered with hairs 1.5–2.5 mm long, more or less without simple hairs upward, but with occasional tiny glands and sparse stellate hairs. Basal leaves 1–3, sometimes withering before anthesis, sometimes large (to 25 cm long), oval, oblong to ovate-lanceolate, acute (6:1), remotely short-toothed, all cuneately tapered to winged petiole, light grassy-green, often violet beneath, sparsely hairy above and along margin, hairs 0.5–0.8 mm long, scattered-hairy beneath with hairs 1 mm long, dense hairs along midrib 1.5 mm long, as a whole pubescence to moderate, stellate hairs only beneath along midrib; cauline leaves 2–3(–5) (coefficient of leafiness 0.06), ovate-lanceolate to narrowly lanceolate, acuminate, bottom leaf short-petiolate, others sessile, remotely and unequally serrate (teeth larger toward base). Inflorescence paniculate, with 6–20 capitula, branched (from axils of cauline leaves); peduncles with few gray hairs having dark base and with occasional glands, clear-tomentose. Involucres 10–12 mm long, ovate, later truncate; involucre bracts acuminate, narrowing from broad base, with sparse, 20(17–30), light-colored hairs 1 mm long with dark base and sparse, 24(17–30), glands 0.4–0.6 mm long, stellate pubescence moderate, conspicuous particularly at base and along margin to tip. Corollas yellow; stigmas dull yellow, later turning brown. Flowering June to July.

Slopes of eskers, open forest edges.—*European Part:* Baltic Region (Estonian SSR). *General distribution:* Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type in Stockholm.

Note. This species represents the Atlantic element of the flora.

274. **H. vulgatum** (Fr.) Almqu. in Thedenius, Flora öfver Upl. o. Söderm. (1871) 361; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III, 76; Dahlst. Beitr. Hier.-Fl. Oesels, 43; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 627; Samuelsson, Maps of Scand. Hier. sp. No. 113; nec auct. alior.—*H. vulgatum* Fr. Nov. ed. 1 (1818) 76, and ed. 2 (1828) 258 p. minore p.; Epicr. 98 p. minore p.—*H. triviale* Norrl. Bidr. Scand. Hier.-Fl. I (1888) 104; in Mela-Cajander, Suom. Kasvio, 716; Zahn in Pflzr. IV, 280, 398.—*H. eutriviale* Zahn in Asch. and Graebn. Synopsis, XII, II (1935) 707.—*H. wischniakowii* Petunn. and Zahn. Hier. Eur. op. I (1906) 13; Hier. fl. Moslquens. 65; Zahn in Pflzr. IV, 280, 369.—**lc.:** Zahn in Pflzr. 399, fig. 31; Syreistsch. Ill. Fl. Mosk. Gub. III, 365; van Soest. Hier. Nederl. I, fig. 34.—**Exs.:** Dahlst. Hier. exs. fasc. II, No. 92;

Herb. Hier. Scand. cent. II, Nos. 89, 90; GRF No. 1850; Zahn, Hier. Europ. Nos. 39 (sub *H. wischniakowii*), 749; Norrl. Hier. exs. fasc. VIII, Nos. 45–47; Herb. norm. XIII, No. 22.

Perennial. Stem 50(20–100) cm high, 1–5 mm in diameter, reddish-violet at base, sparsely covered (sometimes to moderately at base) with soft hairs 1–3 mm long, eglandular, moderately stellate-hairy above. Basal leaves 3(0–5(–8)), sometimes withering before anthesis, obovate, elliptical to oblong-lanceolate, long-tapered to winged petiole, outer obtuse, more or less entire, inner short-acuminate and more abundant and more sharply short-denticulate to more or less uniformly or irregularly dentate, often large (to 23 cm long) (5:1), scattered-pubescent on both sides and along margin with hairs 0.5–1.5 mm long, to densely so beneath along midrib and on petiole with hairs 1.5–2.0 mm long, as a whole pubescence to moderate-hairy, dark green, pale beneath, violet; cauline leaves (1–)2–3(–4) (coefficient of leafiness 0.05), lanceolate or ovate-lanceolate, tapered to petiole (upper leaves sessile), acute or long-acuminate, finely unequally toothed, basal teeth 241 deep, incised, squarrose, narrow and acute, leaves evenly distributed, gradually reduced, pubescence as in basal leaves, often stellate-hairy beneath (at least along midrib) and violet. Inflorescence usually diffusely paniculate, with 2–16(–40) capitula; peduncles sparsely to scatteredly hairy with light-colored, fine hairs 1 mm long, with black base, with occasional, tiny and larger glands 0.3–0.5 mm long, or sometimes eglandular, more or less densely tomentose. Involucres 8–11 mm long, ovate; involucre bracts quite broad, triangular-lanceolate, somewhat obtuse to subacute, barbate at tip, sparsely to scatteredly, 28(11–48), hairy with gray hairs 1.0–1.5 mm long having black base and equally, 24(10–47), glandular with glands 0.3–0.6 mm long, sparsely stellate-hairy at base and along margin. Stigmas yellowish-brown, dull green or dark (in dry specimen usually dark). Highly polymorphic species, particularly variable in indumentum of all plant parts. Flowering July to August.

Shady spruce-pine forests, shady overgrown moraine mounds, sandy and stony slopes, banks of rivers and lakes, edges of mixed forests, parks, subalpine birch forests, meadows.—*European Part*: Karelia-Lapland, Dvina-Pechora, Baltic Region, Ladoga-Ilmen, Upper Volga Volga-Kama. *General distribution*: Scandinavia, Central Europe, Atlantic Europe, Balkans-Asia Minor (northern part of Balkans.) Described from Sweden. Type in stotckholm.

Note. Dahlstedt in Bidr. (op. cit.) combined *H. vulgatum* (Fr.) Almqu. with *H. triviale* Norrl., including the latter with the former as a synonym. Apparently, Norrlin did not differentiate between them, as is evident from his exsiccatae (fasc. VIII, Nos 45–47), but included the

second species in the first (Norrl. in Mela-Cajander, op. cit.). While working on the specimens from Russian herbaria sent to him for examination, Zahn annotated them as either *H. vulgatum* (Fr.) Almqu. or *H. triviale* Norrl. without any consistency. In his (latest) monograph he referred *H. triviale* to the collective species *H. laevicaule* Jord. And, finally, after having studied the abundant Estonian material sent to him, Dahlstedt referred it to *H. vulgatum* (Fr.) Almqu. (*Beitr. Hier.-Fl. Oesels* (1901) cit).

A study of all the above-mentioned material again showed that despite the polymorphism of this species, it was best to split off *H. tritum* Juxip (see note to this species) as a separate species. We propose to consider as the lectotype of *H. vulgatum* (Fr.) Almqu. either Norrlin's specimen (fasc. VIII, Nos. 45-47), preserved in the Herbarium of the Botanical Institute of the Academy of Sciences of the USSR in Leningrad (under the name *H. triviale* Norrl.), or the specimens from the Estonian SSR, determined at one time by Dahlstedt and preserved in Riga (some in Tallin).

We include *H. wischniakowii* Petunn. and Zahn in *H. vulgatum* (Fr.) Almqu. as a synonym, because we could not establish any differences in the major characters of the plant.

242 On some specimens collected from the vicinity of Natalin (Luga District, Leningrad Region) by D.I. Litvinov, the following annotation was made on the labels in his hand: "*H. incanescens* Sael., determinavit Zahn". However, we could not find such a plant name in the literature and even the plant itself did not exhibit any distinctive characters.

Although *H. vulgatum* (Fr.) Almqu. is found quite far to the east (Ust-Shchugor, Vologda Region and Vetluga District of Gorki Region), nevertheless, it should be considered as a plant of western origin. This species is found very often in southern and central Sweden and is extremely common in the Baltic Region (particularly in the western part) and even in Ladoga-Ilmen, but then it abruptly thins out to the east, and the plants reaching the named places are extremes.

275. ***H. lipskyanum*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 494.

Perennial. Stem 30 cm high, 2 mm in diameter, more or less glabrous. Basal leaves 1-2, lanceolate, long-tapered to petiole, acuminate, almost entire, sparsely hairy (glabrous above), with hairs 2.0-2.5 mm long; cauline leaves 2 (coefficient of leafiness 0.07), lanceolate, attenuate to amplexicaul base, acute, entire. Inflorescence paniculate, with 1-3 capitula; peduncles with occasional hairs and glands, with scattered stellate hairs. Involucres 11 mm long; involucral bracts lanceolate, subacute, pubescence to barely, 26(20-30), with stiff, dark hairs 1.5 mm

long, with sparse, 20–60 fine, glands 0.3–0.5 mm long, sparsely stellate-hairy at base. Achenes 3.5 mm long. Flowering July to August.

Banks of lakes.—*Caucasus*: Western Transcaucasia. Endemic. Described from vicinity of Lake Kardabach (former Chernomorsk District). Type in Leningrad.

Note. It is quite close to *H. vulgatum*, replacing it in the Caucasus, and differing from it by insignificant characters, primarily by geographic distribution.

Cycle 8. Incurrentia Juxip.—Hairs and glands on involucre bracts in the proportion of 1/3:2/3; coefficient of leafiness low (0.05–0.04); glands 0.3–0.6 mm long.

276. **H. incurrens** Sael. ex Norrl. in Herb. Mus. Fenn. ed. 2 (1889) 150; Norrl. in Mela-Cajander, Suom. Kasvio, 712; Zahn in Pflzr. IV, 280, 465 (nota); Samuelsson, Maps of Scand. Hier. sp. No. 94.—**Exs.**: Norrl. Hier. exs. fasc. VIII, Nos. 29–36.

243 Perennial. Stem 20–60 cm high, 1.0–2.5 mm in diameter, with sparse hairs 2–4 mm long, more or less eglandular, stellate-hairy above. Basal leaves 5(2–10), oval to lanceolate, obtuse to acute, narrowed to more or less long petiole, to 15 cm long (5:1), dark green, with 3–5 more or less prominent retuse teeth or teeth small, spinose and then leaf subentire, moderately hairy on both sides and scattered-hairy along margin with hairs 0.5–1.0 mm long, densely hairy along midrib beneath, hairs 1.5 mm long, as a whole pubescence to moderate; cauline leaves 2(1–4) (coefficient of leafiness 0.05), lanceolate, bottom leaf tapered to petiole, upper sessile, stellate-hairy beneath, particularly along midrib. Inflorescence paniculate, with 4–7(–10) capitula; peduncles with occasional dark hairs 1 mm long and few glands 0.3 mm long, tomentose. Involucres (9–)10–12 mm long; involucre bracts somewhat broad, acuminate, blackish-green, pubescence to sparse, 16(8–24), hairs with 1 mm long, to scattered, 34(26–50), glandular, glands 0.4–0.7 mm long, at base somewhat stellate-hairy. Stigmas yellowish-brown, dull green to dark. Flowering July to August.

Open deciduous forests, poor meadows, subalpine birch forest around rocks.—*European Part*: Karelia-Lapland, Dvina-Pechora, Ladoga-Ilmen, Baltic Region. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. Judging by Norrlin's (incomplete) diagnosis, *H. murmanicum* Norrl. (Herb. Mus. Fenn. ed. 2, 148; Norrl. in Mela-Cajander, Suom. Kasvio, 719; Zahn in Pflzr. IV, 280, 394 (nota)) apparently should also be referred to this species.

277. **H. chlorelliceus** Norrl. ex Hier. exs. fasc. VIII, No. 71 (1906) (sine descr.) Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XXI.

Perennial. Stem 40–50 cm high, 2 mm in diameter, with occasional hairs, eglandular, sulcate. Basal leaves 3–6, oval to broadly lanceolate (3.5:1), to 16 cm long, more or less abruptly narrowed to petiole, with 6–9 small but larger toward base, acute, unequal teeth, olive-green, more or less glabrous above, hairs scattered beneath, 0.5–1.5 mm long, pubescence along midrib beneath to dense, hairs 2 mm long, as a whole scattered-hairy; cauline leaves 1–3 (coefficient of leafiness 0.04), lower leaf broadly lanceolate, like inner basal leaves, upper sessile, bracteiform. Inflorescence paniculate, with 3–5 capitula; peduncles with occasional short hairs 1 mm long and few small glands 0.3–0.5 mm long, more or less tomentose. Involucres 11 mm long, ovate; involucre bracts broad, acute, sparsely hairy with 10–20 hairs 1 mm long, and scattered (20–30) glands 0.3 mm long, densely stellate-hairy. Stigmas yellowish-brown. Some specimens with abundant pollen. Flowering July.

Herb slopes, pine forest edges.—*European Part*: Dvina-Pechora, Ladoga-Ilmen. Endemic? Described from banks of Onega River (village of Kirillovo). Type in Helsinki; paratype in Leningrad.

Note. It is distinguished from the closely related *H. incurrens* Sael. mainly by the dense stellate hairs on the involucre bracts.

- 244 **Subsection 3. Vulgata** Juxip.—Zahn in Pflzr. IV, 280 (1921) 284 (ut sp. coll.); Asch. and Graebn. synopsis, XII, II, 362, 521 (ut sp. coll. *H. lachenalii* Gmel. p. p.).—Characters in key: Coefficient of leafiness 0.08 (0.03–0.14(0.24)), i.e., number of cauline leaves varies from 1 to 15; basal leaves at anthesis 2–4(0–10); involucre bracts and peduncles with well-developed medium-sized glands (0.4–0.6 mm long), with or without occasional hairs or reaching sparse hairs (hair/gland ratio to 1/4:3/4), usually without pollen.

A highly polymorphic subsection, its range is the same as that of subsection *Laevicaulia*; species of this subsection prefer silicate soils.

1. Involucre bracts with hairs and glands.....2.
- + Involucre bracts with glands only.....16.
2. Number of glands on involucre bracts on average four times as many as hairs, i.e., ratio of hairs to glands approximately 20:803.
- + Number of glands on involucre bracts on average 20–25 times as many as hairs, i.e., ratio of hairs to glands approximately 5:9511.
3. Plants with more or less high coefficient of leafiness (0.15–0.09)....4.

- + Plants with normal (typical) coefficient of leafiness (0.08–0.03) for subsection (average 0.06).....6.
- 4. Glands on involucre bracts sparse (20(10–30)).....278. **H. subasperellum** Zahn
- + Glands on involucre bracts scattered (20–48); plants of Caucasus5.
- 5. Glands on peduncles occasional; stem densely covered below with hairs 5 mm long; stigmas dark.....279. **H. quinqueмонтicola** Juxip
- + Glands on peduncles sparse; stem covered with up to scattered hairs 2.5 mm long; stigmas yellowish-brown.....280. **H. hypopityforme** Juxip
- 6 (3). Glands on involucre bracts scattered (20–45).....7.
- + Glands on involucre bracts in moderate number (50–60); stigmas yellow; plants of Western Siberia.....286. **H. schipczinskii** Juxip
- 7. Glands on peduncles occasional.....8.
- + Glands on peduncles sparse to scattered.....10.
- 8. Leaves scattered hairy.....9.
- + Leaves sparse-hairy, toothed, teeth to 5 mm long; stigmas dull green; plants of the North.....283. **H. subobscuriceps** Zahn
- 245 9. Involucres large, 10–13 mm long; basal leaves hastate (upper two-thirds entire); plants of Baltic Region.....283. **H. acroleucoides** Dahlst.
- + Involucres medium, 9.0–9.5 mm long; basal leaves elliptical to lanceolate, more or less toothed; plants of Far East.....282. **H. tilingii** Juxip
- 10. Glands on peduncles sparse; leaves scattered-hairy; stigmas dark; stem more or less glabrous.....284. **H. adunans** Norrl.
- + Glands on peduncles scattered; leaves moderately hairy; stigmas yellow; stem sparsely (at base more conspicuously) hairy.....285. **H. nenukovii** Juxip
- 11 (2). Plant with comparatively high coefficient of leafiness (0.09), i.e., cauline leaves to 7.....12.
- + Plant with normal (for subsection) coefficient of leafiness (0.07–0.03); glands on involucre bracts scattered, on peduncles occasional.....14.
- 12. Glands on peduncles occasional to sparse; stem sparsely hairy; plants of Caucasus.....13.
- + Glands on peduncles scattered; stem scattered-hairy; stigmas dark; Plants of Baltic Region.....289. **H. latens** Juxip
- 13. Leaves scattered-hairy, with rare fine teeth, at base broadly toothed; cauline leaves 2–5; stigmas dull green or yellowish-brown.....287. **H. macrophyllpodum** Zahn

- + Leaves sparse-hairy; basal leaves 0–1, scarcely denticulate; cauline leaves 7; stigmas yellow.....288. **H. gustavianum** Juxip
- 14. Leaves moderately hairy; stem almost without hairs; cauline leaves 1–3; stigmas dark; plants of Caucasus.....290. **H. subpollichium** (Litw. and Zahn) Juxip
- + Leaves scatteredly or sparsely hairy; stigmas yellow.....15.
- 15. Leaves scattered hairy; stem to scattered-hairy; cauline leaves 3–4; involucre 10 mm long; plants of Caucasus.....291. **H. subhastulatum** Zahn
- + Leaves sparsely hairy; stem more or less glabrous; cauline leaves 1–2; involucre 11 mm long; pappus chestnut-colored; plants of Scandinavia.....292. **H. sordidescens** Norrl.
- 16 (1). Plant with more or less high coefficient of leafiness (0.15–0.09); involucre 8.5–10.0 mm long.....17.
- + Plant with normal (typical for subsection) coefficient of leafiness (0.07–0.05).....20.
- 17. Glands on involucral bracts sparse (20), occasional on peduncles; leaves scattered-hairy; stem more or less glabrous; stigmas yellowish-brown; cauline leaves 9–15; plants of Caucasus.....293. **H. acuminatifolium** Litw. and Zahn
- + Glands on involucral bracts scattered; stigmas dark.....18.
- 18. Glands on peduncles occasional or sparse; leaves moderately hairy.....19.
- + Glands on peduncles scattered; leaves scattered-hairy; involucral bracts densely stellate-hairy; plants of Baltic Region.....296. **H. praetermissum** Juxip
- 19. Inflorescence openly paniculate, with 14–18 capitula; inflorescence branches with small bracteiform leaves; pubescence on stem to sparse; plants of Baltic Region.....294. **H. silvicomum** Juxip
- + Inflorescence with fewer capitula (to 7); stem scattered-hairy; plants of Urals.....295. **H. wolczankense** Juxip
- 20 (16). Glands on involucral bracts scattered (25–45).....21.
- + Glands on involucral bracts moderate (50–60) to more or less dense (70).....31.
- 21. Glands on occasional; leaves scattered-hairy.....22.
- + Glands on peduncles sparse to scattered.....24.
- 22. Stigmas dark.....23.
- + Stigmas yellow; corollas pale yellow; glands yellowish-brown; plants of the North.....299. **H. cereolinum** Norrl.
- 23. Involucral bracts very densely stellate-hairy; stem almost without hairs; leaves denticulate; plants of Urals.....297. **H. poliudovense** Juxip

- + Involucral bracts only somewhat stellate-hairy (outer bracts, along margin); leaves unevenly serrate (sometimes teeth to 12 mm long); plants of Caucasus.....298. **H. hypopitys** Litw. and Zahn
- 24. Glands on peduncles sparse.....25.
- + Glands on peduncles scattered; leaves toothed.....29.
- 25. Leaves moderately hairy.....26.
- + Leaves scatteredly or sparsely hairy; stigmas yellow.....27.
- 26. Stigmas dark; leaves toothed; cauline leaves 2–4; stem with occasional hairs.....300. **H. arcuatidens** Zahn
- + Stigmas yellow; leaves more or less entire; cauline leaves 5; stem to scattered short-pubescent.....301. **H. petrofundii** Juxip
- 27. Leaves scattered-hairy.....28.
- + Leaves sparse-hairy, broadly crenate-toothed; plants of Baltic Region.....304. **H. virenticeps** Dahlst.
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Cycle 1. **Asperella** Juxip.—Ratio of hairs to glands on involucre bracts 20:80; coefficient of leafiness more or less high, 0.15–0.09.

278. **H. subasperellum** Zahn in Pflzr. IV, 280 (1921) 385.—*H. asperellum* Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 142; non Brenn.

248 Perennial. Stem 30–65 cm high, 1.5–3.0 mm in diameter, with up to sparse, stiff hairs 1–2 mm long, mainly at base, somewhat stellate-hairy. Basal leaves 1–3, elliptical to lanceolate, tapered to petiole, scarcely denticulate, glabrous above or with sparse hairs, sparsely pubescent along margin and midrib beneath with short, stiff hairs 0.5–1.5 mm long, as a whole sparse-hairy, dark grassy-green; cauline leaves 5–10 (coefficient of leafiness 0.14), lanceolate, lower leaves with short, winged petiole, with fine short, spinose teeth; upper leaves sessile, very acuminate, almost entire, stellate-hairy on both sides. Inflorescence paniculate, with 2–12 capitula; peduncles with occasional short (0.5 mm long) hairs and glands, grayish-tomentose. Involucre (8.5–)11–12 mm long, thick, later truncate; involucre bracts somewhat broad, obtuse, dark green, glabrous or with occasional stiff hairs, and sparse glands 20(10–30), more or less without stellate hairs; stigmas dark. Flowering August.

Coniferous montane and mixed forests.—*European Part*: Dvina-Pechora, Volga-Kama (Urals); Western Siberia. Described from bank of Usa River (tributary of Pechora River). Type in Leningrad.

279. **H. quinquemonticola** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 494.

Perennial. Stem 60 cm high, 3 mm in diameter, sulcate, densely covered below with hairs 5 mm long, becoming glabrous upward, tip without hairs and glands, somewhat stellate-hairy; basal leaves withering before anthesis; cauline leaves 8 (coefficient of leafiness 0.13),

broadly lanceolate (3:1), sessile, with narrowed base, short-acuminate, coarsely serrate (with unequal teeth to 10 mm long), sparsely covered above with hairs 3 mm long, along margin and beneath with hairs 1.5–2.0 mm long, densely hairy along midrib beneath, as a whole to scattered-hairy. Inflorescence paniculate, with 4 capitula; peduncles glabrous, with occasional glands 0.3 mm long; scattered-tomentose. Involucres 10.5 mm long; involucral bracts with few, 7(3–11), hairs 1 mm long, without scattered, 36(24–48) glands 0.3–0.1 mm long, without stellate hairs; stigmas dark. Flowering June.

Open deciduous forests, at 600 m.—*Caucasus*: Ciscaucasia. Endemic. Described from vicinity of Pyatigorsk (Mashuk Hill). Type in Leningrad.

Note. Closely related to *H. hypopityforme* Juxip, but distinguished by dark stigmas and only occasional glands on the peduncles and dense, long hairs at the base of the stem.

280. ***H. hypopityforme*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 495.

Perennial. Stem 30–55 cm high, 2.0–3.5 mm in diameter, sulcate at base to scattered pubescence with hairs 2.5 mm long, becoming glabrous at top, sometimes with occasional glands and rare stellate hairs.
 249 Basal leaves 3, lanceolate, more or less abruptly narrowed to long petiole, to 22 cm long (4:1), with 3–5 small, acute teeth, on both sides and along margin sparse-hairy, with hairs 0.5–1.5 mm long, to densely hairy along midrib beneath and on petiole with hairs 1.5–2.0 mm long, as a whole pubescence to scattered; cauline leaves 3–6 (coefficient of leafiness 0.09), lanceolate, bottom leaf short-petiolate, others with broad rounded base, sessile, unequally sharp-toothed, acute. Inflorescence paniculate, with 3–12 capitula; peduncles with occasional hairs 1 mm long, sparse-glandular, scattered-tomentose. Involucres 8.0–11.5 mm long; involucral bracts somewhat narrow, acute, with occasional, 9(8–12), hairs 1 mm long, with sparse (to scattered), 29(20–44), glands 0.5 mm long, more or less without stellate hairs; stigmas yellowish-brown. Flowering July to August.

Pine forests, subalpine meadows.—*Caucasus*: Ciscaucasia, Western Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern Anatolia). Described from Olty-District (former Karssk Region). Type in Tbilisi.

Note. The specimen considered as the type (No. 4874 of our analysis) was identified by Zahn as *H. hypopitys* Litw. and Zahn, and its locality was mentioned in the monograph (Kotik im Bezirk Olty (Prov. Kars.): Zahn in *Pflzr.* IV, 280, 368).

However, despite the evident closeness, this plant does not fit the diagnosis of *H. hypopitys* Litw. and Zahn, because clearly identifiable hairs are present on its involucre bracts, and the stigmas are yellow, besides, and not dark as in *H. hypopitys*.

Cycle 2. Adunantia Juxip.—Ratio of hairs to glands on involucre bracts 20:80; coefficient of leafiness 0.08–0.03.

281. *H. acroleucoides* Dahlst. Beitr. Hier.-Fl. Oesels (1901) 41; non Murr and Zahn: Zahn in Pflzr. IV, 280, 392; Asch. and Graebn. Synopsis, XII, III, 701.—*Ic.*: Dahlst, l. c. t. VI, fasc. 2, t. VII, 1 (folia).

Perennial. Stem 40–60 cm high, 1.5–2.0 mm in diameter, reddish at base and with occasional hairs or more or less glabrous, stellate-hairy above. Basal leaves 4–8 (not typical of subsection), elliptical and broadly lanceolate to oblong-hastate, more or less abruptly narrowed in petiole, lamina at base with few (2–6), short to 5 mm long, remote, acute teeth, inner leaves entire to 2/3 of length, acuminate, to 17 cm long (5:1), with occasional hairs 1 mm long on both sides, scattered-pubescent along margin, but moderate along midrib beneath, as a whole scattered-pubescent, hairs 1.5 mm long, light green, paler beneath; cauline leaves 2–4 (coefficient of leafiness 0.06), remote, lanceolate, bottom leaf short-petiolate, with one pair of teeth at base of lamina, like inner basal leaf, others sessile, entire, acuminate, pubescence as in basal leaves. Inflorescence openly paniculate, with 5–7 capitula; peduncles with occasional, short hairs and glands, tomentose. Involucres 10–13 mm long, ovate; involucre bracts linear-lanceolate, somewhat obtuse, dark, slightly barbate, with few, 5(2–11), hairs 1 mm long and sparse (25–28) glands 0.4 mm long, very sparsely stellate-hairy; stigmas dark. Flowering July.

Open deciduous forests.—*European Part*: Baltic Region. Endemic. Described from Saaremaa Island (Oesel). Type in Stockholm.

282. *H. tilingii* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 495.—*H. vulgatum* Fr. ex Regel and Tiling., Florula Ajanensis (1859) 108.

Perennial. Stem 25–45 cm high, 1.0–2.5 mm in diameter, pale violet at base, more or less glabrous, sometimes with occasional glands above. Basal leaves 4(2–9), elliptical to lanceolate, tapered to short or more or less long petiole, acuminate, denticulate or to sharply toothed (teeth alternatively triangular or lanceolate, to 7 mm long) (5:1), olive-green, glabrous above, sparsely hairy along margin, scatteredly so beneath, densely along midrib, and scatteredly hairy as a whole, with hairs 0.5–1.2 mm long; cauline leaves 2–3 (coefficient of leafiness 0.07),

lanceolate, lower short-petiolate, upper sessile, toothed, acute. Inflorescence paniculate, with 3(1–5) capitula; peduncles glabrous or with occasional hairs and glands, tomentose. Involucres 9.0–9.5 mm long; involucre bracts linear, more or less acute, with occasional hairs (6–7) 1 mm long, and sparse 27(25–30), glands 0.5–0.7 mm long, almost without stellate hairs. Corollas golden yellow; stigmas dark. Flowering July to August.

Taiga, sparse larch forests, around old burns among birch forests. *Far East*: Okhotsk, Ussuri, Sakhalin. Endemic? Described from Ayan. Type in Leningrad.

Note. The specific status of this plant remains unresolved to the present time. Insofar as can be judged on the basis of the quantitatively and qualitatively scanty material at our disposal, this species is very homogeneous and not like any of the known Siberian species, which reach even to the Lena-Kolyma Region, e.g., *H. farinirum* Ganesch. and Zahn, but it is close to the forms of the extreme north of the European part of the Soviet Union (e.g., *H. obscuriceps* Dahlst.). On the other hand, the occurrence of this plant in places associated with human activities suggests the possibility of introduction from Russia and formation here of a new race adapted to the new environment. Moreover, similar modifications could have occurred comparatively very fast (if we take into consideration the fact that these regions were brought under cultivation only about a hundred years ago).

- 251 283. *H. subobscuriceps* Zahn in Pflzr. IV, 280 (1921) 374; Asch. and Graebn. Synopsis, XII, II, 562.—*H. obscuriceps* Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III (1894) 141, non N.P. (1885), nec Norrl. (1884).—**Exs.**: Dahlst. Hier. exs. II, No. 72.

Perennial. Stem 20–60 cm high, 1–3 mm in diameter, violet at base, with occasional hairs, somewhat stellate-hairy above. Basal leaves 2–6, oval-oblong, obovate to oblong-lanceolate, narrowed to petiole, short-acuminate, with 5–7 teeth to 5 mm long, acute, serrate, with occasional hairs above, sparsely hairy along margin and beneath to; moderate along midrib, as a whole sparsely hairy, olive-green, paler beneath; cauline leaves 2(4) (coefficient of leafiness 0.05), lanceolate, short-petiolate, acuminate. Inflorescence paniculate with 2–11 capitula; peduncles with occasional short hairs and few glands 0.3 mm long, white-tomentose. Involucres 8.5–10.5 mm long; involucre bracts linear-lanceolate, subacute, dark, with occasional, 7(2–14), dark hairs 1 mm long and sparse, 28(10–40), glands 0.3–0.5 mm long, scarcely stellate-hairy at base. Stigmas dull green, turning dark; achenes 3.5 mm long. Flowering July to August.

Pine and spruce forests, stony alluvial deposits.—*European Part*: Karelia-Lapland, Dvina-Pechora, Volga-Kama. *General distribution*: Scandinavia, Central Europe, Mediterranean Region. Described from Sweden. Type in Stockholm? Uppsala?

284. **H. adunans** Norrl. Herb. Mus. Fenn. Hier. ed. 2 (1889) 150; in Mela-Cajander, Suom. Kasvio, 712; Samuelsson, Maps of Scand. Hier. sp. (1954) No. 71.—*H. approximatum* Norrl. Bidr. Scand. Hier.-Fl. I (1888) 112.—*H. praeteneriforme* Almqu. ex Dahlst. in Acta horti Berg. I, 7 (1891) 40; Dahlst. Bidr. Hier.-Fl. Oesel, 40; Zahn in Pflzr. IV, 280, 465; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 622.—*H. murorum* L., ssp. *praeteneriforme* Almqu. ex Dahlst. Om nagra i Berg. trädg. odl. Hier. (1891).—**Exs.**: Norrl. Hier. exs. facs. VIII, Nos. 37–39, 140, 141 (sub *H. approximata*); Dahlst. Hier. exs. II, No. 86; Herb. Hier. Scand. cent. V, No. 56 (sub *praeteneriforme*); GRF No. 1300.

Perennial. Stem 50(35–75) cm high, 1.5–3.5 mm in diameter, sulcate, somewhat violet at base and with occasional hairs 2–3 mm long or glabrous, usually eglandular or with few glands below inflorescence, quite sparsely stellate-hairy. Basal leaves 5(2–9), broadly or narrowly lanceolate, tapered to short petiole, acuminate, with scattered sharp teeth (5–7), to 20 cm long (5:1), grayish- or grassy-green, glaucescent beneath, to scattered-hairy on both sides and along margin, with short hairs 0.5–1.0 mm long, to densely pubescent along midrib beneath, with hairs 1.5–2.0 mm long, as a whole to scattered-hairy, stellate hairs absent above, very sparsely pubescent along midrib beneath; cauline
252 leaves 2(1–3) (coefficient of leafiness 0.04), narrowly lanceolate short-petiolate (upper leaf sessile), acuminate, pubescence less than on basal leaves, but stellate hairs more conspicuous: occasional above, scattered beneath. Inflorescence paniculate, 10(3–20) capitula; penduncles with occasional hairs or entirely glabrous (quite rarely sparsely hairy), sparsely glandular, grayish-tomentose. Involucre (9–)10–12 mm long; involucre bracts narrow, short-acuminate, dark, with occasional, 10(6–17), light-colored, hairs 1 mm long with dark base, with scattered, 35(20–45(55)), glands 0.4–0.6 mm long, quite sparsely stellate-hairy. Corollas yellow; stigmas dark. Flowering July.

Edges of dry deciduous and coniferous forests, in scrubs and meadows overgrown with open forests, dry stony and sandy slopes.—*European Part*: Karelia-Lapland, Dvina-Pechora, Baltic Region (Estonian SSR), Ladoga-Ilmen (northern part). *General distribution*: Scandinavia (central part). Endemic. Described from Sweden. Type in Helsinki.

Norrin reports that besides specimens with dark stigmas, individuals with yellow stigmas are also found (a variety?).



285. **H. nenukovii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 496.

Perennial. Stem 60(30–80) cm high, 1.5–4.0 mm in diameter, sparsely (more conspicuously at base) hairy with hairs 1.0–2.5 mm long, eglandular. Basal leaves 4(1–6), elliptical, tapered to short petiole, emarginately obtuse to lanceolate and oblong-lanceolate, to 16 cm long (5:1), abruptly narrowed to quite long, winged petiole, acute, with 6–9 pairs of unequal (1–5 mm long) acute teeth, olive-green, sparsely hairy above, with scattered hairs along margin and beneath, with hairs 0.5–1.5 mm long, densely hairy along midrib beneath, and as a whole, moderately hairy with hairs 1.5–2.5 mm long; cauline leaves 2–3(1–4) (coefficient of leafiness 0.04), lanceolate, bottom leaf short-petiolate, others abruptly narrowed, sessile, often coarsely sharp-toothed at base, acute, somewhat stellate-hairy beneath. Inflorescence paniculate, with 9(2–20) capitula; peduncles with occasional hairs 1 mm long and sparse glands, 0.4–0.6 mm long, grayish-tomentose. Involucres 10(8.0–11.5) mm long; involucre bracts lanceolate, subobtusate, with occasional, 10(8–16), hairs 1 mm long and scattered, 30(20–50), glands 0.5–1.0 mm long, almost without stellate hairs. Stigmas yellow. Flowering July to August.

Forest edges, in mountain taiga.—*European Part*: Dvina-Pechora, Baltic Region, Ladoga-Ilmen, Volga-Kama. Endemic. Described from Latvian SSR. Type in Riga.

Note. The species is quite close to *H. praecipuum* Dahlst., differing from it mainly by yellow stigmas and a more eastern range.

255 286. **H. schipczinskii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 496.

Perennial. Stem 25–35 cm high, 1–2 mm in diameter, pubescence to sparse, hairs 1.0–1.5 mm long, occasional glands above. Basal leaves 2–4, lanceolate, narrowed to petiole, denticulate (5:1), glabrous above, pubescence to scattered along margin and beneath, hairs 1 mm long, along midrib to 1.5 mm long, pubescence as a whole to scattered; cauline leaves 2–3 (coefficient of leafiness 0.08), lanceolate, tapered toward base, sessile, acute. Inflorescence paniculate, with 1–3 capitula; peduncles with occasional hairs and glands, tomentose. Involucres 9 mm long; involucre bracts narrow, acute, with occasional (13) light-colored hairs 1 mm long, moderately (53) glandular, glands 0.5 mm long, more or less without stellate hairs. Stigmas yellow. Flowering July.

Pine forests.—*Western Siberia*: Ob' Region. Endemic. Described from valley of Kas River. Type in Leningrad.

Cycle 3. Lantentia Juxip.—Ratio of hairs to glands on involucre bracts 5:95; coefficient of leafiness 0.09.

287. **H. macrophyllopodium** Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 28; Zahn in Pflzr. IV, 280, 363.

Perennial. Stem 25–50 cm high, 1.0–2.5 mm in diameter, violet below, pubescence to sparse, hairs 1 mm long, eglandular, with stellate hairs above. Basal leaves 2–8, often large, to 17 cm long, broad (2.5–4:1), ovate or oblong-lanceolate, more or less abruptly tapered to short petiole, acuminate, with rare fine teeth or toward base with broad teeth, grassy-green, often reddish beneath, on both sides and along margin sparsely hairy with hairs 1 mm long, with scattered hairs along midrib beneath and on petioles (as also as a whole); cauline leaves 2–5 (coefficient of leafiness 0.09), abruptly reduced, lanceolate, tapered toward sessile base, upper leaves linear, without stellate hairs. Inflorescence paniculate, with 2–14 capitula; peduncles with occasional hairs, somewhat glandular, grayish-tomentose. Involucres 9–10(–11.5) mm long; involucre bracts linear-lanceolate, subacute, with dark midrib and green border, with few, 3(2–5) hairs 1 mm long and scattered, 35(20–53), glands 0.5–0.6 mm long, along margin somewhat stellate-hairy. Corollas golden yellow; stigmas yellowish-brown or dull green. Flowering June to August.

Pine and birch forests, subalpine meadows, 1800–2400 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia, ?Southern Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern Anatolia). Described from former Olty District. Type in Tbilisi.

288. **H. gustavianum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 496.

256 Perennial. Stem 80 cm high, 4 mm in diameter, sparsely hairy with hairs 2.5 mm long at base, with occasional glands above. Basal leaves at anthesis 0–1, lanceolate, long-tapered to petiole, acute, scarcely denticulate (6.5:1), with sparse hairs 0.5–1.0 mm long; cauline leaves 7 (coefficient of leafiness 0.09), lanceolate, gradually reduced, acute, glabrous above, sparsely hairy along margin and beneath, to densely hairy along midrib beneath, scattered-hairy as a whole. Inflorescence paniculate, with 13 capitula; peduncles with occasional hairs 1 mm long and glands 0.4 mm long, tomentose. Involucres 10.5 mm long; involucre bracts with occasional, 6(3–8), hairs 1 mm long with scattered, 44(32–56), glands 0.5 mm long, almost without stellate hairs; stigmas yellow. Flowering August.

Caucasus: Western Transcaucasia. Endemic. Described from Akhaltsikhe Region (Dzhikhi-Dzhvari). Type in Leningrad.

Note. It is distinguished from the closely related species *H. macrophyllopodium* Zahn by a somewhat higher number of cauline leaves.

289. **H. latens** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 497.

Perennial. Stem 70 cm high, 2.5 mm in diameter, scattered-hairy below, eglandular, strongly branched. Basal leaves to 7, rosulate, obovate, small, to oblong-lanceolate and quite large (to 18 cm long), narrowed to more or less short petiole, outer leaves scarcely denticulate, others with many (to 10), long (10 mm) and short alternating triangular and lanceolate teeth, partly bent and acute; leaves olive-green, sparsely hairy above with hairs 0.5 mm long, with scattered short pubescence (1 mm long) beneath, along margin and midrib, and as a whole; cauline leaves 6 (coefficient of leafiness 0.09), evenly distributed, lanceolate, like basal leaves, lower leaves short-petiolate, upper sessile with tapered base, toothed, acute. Inflorescence paniculate-umbellate, quite spread out, with up to 25 capitula; peduncles without simple hairs, scatteredly glandular, tomentose. Involucres 10 mm long; involucre bracts somewhat narrow, subacute, with few (0–6) hairs and sparse, 42(24–46), glands 0.3 mm long, more or less without stellate hairs. Stigmas dark.

Dry meadows overgrown by forest, dune pine forests.—*European Part:* Baltic Region (Estonian SSR). Endemic. Described from Capsalya Region. Type in Tallin.

Note. It is distinguished from closely related species (e.g., *H. macrophyllopodium* Zahn or *H. gustavianum* Juxip) by its scattered-glandular peduncles.

Cycle 4. Subhastata Juxip.—Ratio of hairs to glands on involucre bracts 5:95; coefficient of leafiness 0.07–0.03.

290. **H. subpolluchium** (Litw. and Zahn) Juxip comb. n. in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 497.—*H. divisum* Jord. ssp. *pollichiae* Sch. Bip. var. *sub-pollichiae* Litw. and Zahn in Fedde, Repert. IV (1907) 237; in Sched. HFR, XLII, 9; Zahn in Pflzr. IV, 280, 516.—**Exs.:** GRF. No. 2069.

Perennial. Stem 25–50 cm high, 2–3 mm in diameter, violet at base, more or less glabrous, with sparse stellate hairs. Basal leaves 4–6, oblong-ovate to lanceolate, quite large (to 18 cm long), broad (3.5:1), abruptly narrowed to long, winged petiole, short-acuminate, outer leaves more or less entire, inner in lower part with 5 small teeth, entire toward tip, glabrous above, sparsely hairy beneath with hairs 1.0–2.5 mm long,

densely so along midrib beneath, along margin scatteredly and as a whole moderately hairy. Cauline leaves 1–3 (coefficient of leafiness 0.04), broadly lanceolate (usually only bottom leaf larger), like basal leaves; upper leaf smaller, bracteiform. Inflorescence paniculate, spread out, with 5–13 capitula; peduncles glabrous or with occasional hairs and glands, tomentose. Involucres 10–11 mm long; involucre bracts narrow, subobtusate, glabrous or with very few hairs, to moderately, 42(24–62), glandular with glands 0.3–0.5 mm long, along margin scatteredly stellate-hairy. Stigmas dark. Flowering June.

Open pine forests, at 1260 m.—*Caucasus*: Eastern Transcaucasia, Western Transcaucasia, Endemic. Described from Teberda. Type in Tbilisi; paratype in Leningrad.

This plant, issued in the GRF (No. 2069), was treated by Zahn as a variety of *H. divisum* Jord. ssp. *pollichiae* Sch. Bip. However, in view of the large gap between the ranges of *H. divisum* Jord. and *H. vulgatum* Fr. s. l. (or subsection *Vulgata*), we decided to include it as a separate species in cycle *Subhastata* of subsection *Vulgata*.

It is distinguished from the closely related *H. subhastulatum* Zahn mainly by its glabrous peduncles and dark stigmas.

291. *H. subhastulatum* Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 28; Zahn in Pflzr. IV, 280, 375.

Perennial. Stem 50 cm high, 2 mm in diameter, pubescence to scattered (more conspicuously at base), eglandular, somewhat stellate hairy throughout. Basal leaves withering before anthesis or very few (0–2), outer ovate, others broadly lanceolate, gradually tapered to winged petiole, acuminate, denticulate above middle or almost entire, toward base serrate with short or long, bent teeth (sometimes with free teeth along petiole), grassy-green, usually glabrous above, scattered-hairy beneath and along margin, hairs 1.0–1.5 mm long, moderately hairy along midrib with scattered pubescence as a whole; cauline leaves 3–4 (coefficient of leafiness 0.07), remote, like basal, abruptly
 258 reduced, bottom leaf with short, winged petiole, and 2–3 pairs of prominent teeth at base, entire above, hastate, others sessile, with 1–2 teeth at base, acuminate, upper leaves linear. Inflorescence openly paniculate, with 5–12 capitula; peduncles with hairs 1 mm long, pubescence to sparse and with occasional glands 0.3 mm long, tomentose. Involucres 10 mm long; involucre bracts linear-lanceolate, subobtusate to acute, dark green, glabrous or with few (0–3) hairs 1 mm long, glands to scattered, 38(30–46), 0.3–0.5 mm long, more or less without stellate hairs. Corollas golden yellow; stigmas brown. Flowering July to August.

Subalpine forests.—*Caucasus*: ?Southern Transcaucasia. *General distribution*: Eastern Anatolia. Endemic. Described from former Artvin District. Type in Leningrad.

292. **H. sordidescens** Norrl. in Herb. Mus. Fenn. ed. 2 (1889) 112; Norrl. in Mela-Cajander, Suom. Kasvio, 719; Zahn in Pflzr. IV, 280, 405.—*H. fulvescens* Norrl. in Acta Soc. Fa. and Fl. Fenn. III, No. 4 (1888) 101, non N. P.; Samuelsson, Maps of Scand. Hier. sp. (1954) No. 91.—*Exs.*: Norrl. Hier. exs. fasc. VIII, Nos. 72–74.

Perennial. Stem 40–50 cm high, 2 mm in diameter, light green, more or less glabrous, with scattered stellate hairs above. Basal leaves to 5, elliptical, obtuse, oblong-lanceolate, quite abruptly narrowed to long petiole, broad (3.5:1), long-acuminate, coarsely serrate, teeth (8–10) triangular or lanceolate, broad and narrow, long (up to 10 mm) and short alternating, acute, free on petiole, light grassy-green, glabrous above or with sparse (along margin) hairs 0.3 mm long, sparsely hairy beneath (even along midrib) and along margin with hairs 0.5–1.5 mm long, as a whole to sparsely hairy, without stellate hairs; cauline leaves 1–2 (coefficient of leafiness 0.03), lower leaf lanceolate, broad, sessile, acuminate, with large teeth (upper leaf mostly bracteiform), with simple hairs only along lower midrib, stellate-hairy. Inflorescence paniculate, with 3–7 capitula; peduncles glabrous, sometimes with occasional glands, scattered-tomentose. Involucres 11.0–12.5 mm long; involucre bracts glaucous, with pale margin, linear, subobtusate, glabrous or with occasional hairs, with sparse (to scattered), 26(16–36), glands to 1 mm long, stellate hairs only at base of outer bracts. Stigmas yellow; pappus yellowish-rusty. Flowering July to August.

Meadows overgrown by forests.—*European Part*: Ladoga-Ilmen (northern part). *General distribution*: Scandinavia. Described from Finland. Type in Helsinki; paratype in Leningrad.

Note. Samuelsson in his atlas of the distribution of Scandinavian hawkweeds (op. cit.) identifies *H. fulvescens* Norrl. with *H. laeticeps* Dahlst. However, based on the scanty material at our disposal, we cannot include the latter species in the former as a synonym, although we are not able to indicate their phylogenetic relationship.

259 **Cycle 5. Acuminatifolia** Juxip.—Involucre bracts only with glands (without hairs); coefficient of leafiness 0.15–0.09.

293. **H. acuminatifolium** Litw. and Zahn in Fedde, Repert. IV (1907) 238 p. p.; Schedae HFR XLII, 22; Zahn in Pflzr. IV, 280, 389 p. p.—*Exs.*: GRF No. 2098, p. max p.

Perennial. Stem 60–95 cm high, 1.5–2.5 mm in diameter, sulcate, with occasional hairs (appearing glabrous at first glance), eglandular, somewhat stellate-hairy above. Basal leaves to 3–4, often withering before anthesis, lanceolate, tapered to winged petiole, acuminate, with 6–8 fine teeth (occasional teeth in lower and middle parts of lamina larger, to 5 mm long), glabrous above, with sparse hairs (0.5–1.5 mm long) along margin and beneath along midrib beneath moderately and as a whole sparsely hairy, light green, paler beneath; cauline leaves 9–15 (coefficient of leafiness 0.15), lanceolate, lower leaves tapered to short petiole, others cuneate, sessile, unequally short-toothed with 2–5 teeth, acuminate, entire toward tip. Inflorescence paniculate, with 12–25 capitula; peduncles glabrous (or with occasional hairs), with few glands 0.3 mm long, scattered-tomentose. Involucres 8.5–9.5 mm long, ovate, later truncate; involucre bracts lanceolate, acuminate, dark green, glabrous, with sparse (17–22) glands 0.4–1.0 mm long, more or less without stellate hairs. Stigmas yellowish-brown, later turning dark. Flowering June to August.

Forests.—*Caucasus*: Ciscaucasia. Endemic. Described from Zheleznovodsk District. Type in Leningrad.

Note. In habit it resembles members of section *Tridentata*.

294. **H. silvicomum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 498.

Perennial. Stem 40–50 cm high, 2.5 mm in diameter, to sparsely hairy, eglandular. Basal leaves 2–4, more or less narrowly lanceolate, tapered to short, winged petiole, acuminate, denticulate with widely spaced teeth, glaucescent, moderately hairy; cauline leaves 6(5–7) (coefficient of leafiness 0.13), lanceolate, lower short-petiolate, upper with narrow base, sessile, acuminate, crenate, glabrous above, to moderately hairy beneath and along margin with hairs 0.5–1.0 mm long, with dense hairs along midrib 1.5 mm long, as a whole to moderately hairy. Inflorescence openly paniculate, with 14–18 capitula; branches from axils of upper leaves, with small bracteiform leaves; peduncles almost without hairs and glands (or with occasional ones), tomentose. Involucres 9.5 mm long; involucre bracts lanceolate, subobtusely, glabrous (or with 1–2 hairs, particularly in apical capitulum), with scattered, 33(24–48), glands 0.3–0.6 mm long, more or less without stellate hairs. Stigmas dark. In habit resembling pauciphyllous forms of section *Tridentata* but distinguished from them by involucre bracts having numerous, well developed glands. Flowering July.

Open deciduous forests.—*European Part*: Baltic Region. Endemic. Described from Lake Vormsi (Estonian SSR). Type unknown.

295. **H. wolczankense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 498.

Perennial. Stem 60 cm high, 3 mm in diameter, sulcate, violet at base, to scattered-hairy in lower half, hairs 2 mm long, glabrous and eglandular above. Basal leaves at anthesis (0–)2, lanceolate, tapered to petiole, with 4–5 small teeth, acute (5.5:1), to moderately hairy above, sparsely beneath, scattered-pubescent along margin and on midrib, as a whole scattered hairy, hairs 1–2 mm long; cauline leaves 7 (coefficient of leafiness 0.13), lanceolate, tapered to short petiole or sessile, with 2–4 distinct teeth, densely hairy beneath along midrib, to moderately hairy as a whole. Inflorescence paniculate, with few (7) capitula; peduncles without simple hairs or with occasional hairs, with few or sparse glands, densely tomentose. Involucres 8–10 mm long; involucre bracts narrow, acute, glabrous, with scattered (30–50) glands 0.5–0.2 mm long (with yellow tips, reduced toward top), with sparse stellate hairs. Stigmas dark. Flowering July to August.

Herb-birch forests.—*European Part*: Volga-Kama. Endemic. Described from Central Urals (Volchanok). Type in Leningrad.

Note. Distinguished from the closely related species *H. acuminatifolium* Litw. and Zahn by its considerably higher number of glands on the involucre bracts and its dark stigmas.

296. **H. praetermissum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 499.

Perennial. Stem 65 cm high, 2.5 mm in diameter, sparsely hairy, eglandular. Basal leaves 3, elliptical to oblong-lanceolate, tapered to winged, more or less long petiole, acuminate, denticulate, to 18 cm long (6.5:1), olive-green, sometimes violet, with sparse hairs 1 mm long on both sides and along margin, to moderately hairy along midrib beneath, hairs 1.5 mm long, pubescence as a whole to scattered; cauline leaves 8 (coefficient of leafiness 0.12), lanceolate, lower short-petiolate, others sessile with narrowed base, acute, distinctly toothed. Inflorescence paniculate, with 10–15 capitula; peduncles more or less glabrous, with scattered glands, tomentose. Involucres 9.5 mm long; involucre bracts linear-lanceolate, acute, glabrous, with scattered (35) glands 0.4 mm long, densely stellate-hairy. Stigmas dark. In habit it resembles *H. vulgatiforme* or few-leaved forms of section *Tridentata*, differing from the former by its glabrous involucre bracts and from the latter by large number of glands in its inflorescence. Flowering July.

Forested moraines.—*European Part*: Baltic Region. Endemic. Described from Alevgiidu Region (Estonian SSR). Type in Tartu.

Cycle 6. Anfracta Juxip.—Involucral bracts only with glands to scattered (coefficient of leafiness 0.07–0.05).

297. **H. poliudovense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 499.

Perennial. Stem 40–60 cm high, 1.5–3.0 mm in diameter, more or less glabrous. Basal leaves 2–4, ovate-lanceolate, tapered to long petiole, to 20 cm long (4:1), denticulate, acute, very sparsely hairy above with hairs 0.5 mm long, with hairs 1 mm long along margin and beneath, with scattered hairs along midrib, sparsely hairy as a whole; cauline leaves 2(–3) (coefficient of leafiness 0.05), lanceolate, acute like basal leaves, glabrous above, scattered-hairy along margin and beneath, dense-hairy along midrib with hairs 1.5 mm long, as a whole scattered-hairy. Inflorescence paniculate, with 5–11 capitula; peduncles bent upward, glabrous, with occasional to sparse glands, scattered-tomentose. Involucres 9 mm long; involucral bracts linear, subacute, glabrous, with scattered, 30(20–33), glands 0.5–1 mm long, very densely stellate-hairy. Stigmas dark. Flowering August.

Montane spruce forests.—*European Part*: Volga-Kama (Urals). Endemic. Described from Polyudov Kamen Mountain. Type in Leningrad.

Note. Distinguished from the closely related species *H. hypopitys* Litw. and Zahn by its densely stellate-hairy involucral bracts and denticulate leaves.

298. **H. hypopitys** Litw. and Zahn in Fedde, Repert. IV (1907) 237 sub div.; Schedae HFR XLII, No. 2068; Zahn in Pflzr. IV, 280, 368.—**Exs.**: GRF No. 2068.

Perennial. Stem 25–80 cm high, 1–3 mm in diameter, sulcate, violet at base, sparsely covered with soft hairs 2–5 mm long, almost glabrous above, somewhat stellate-hairy, sometimes with occasional glands. Basal leaves 1–8, oblong-lanceolate, tapered to long petiole, subacute, to 20 cm long (4.5:1), unequally (serrately) toothed (sometimes teeth broadly triangular, acute, to 12 mm long), grassy-green, paler beneath, sparsely hairy above with hairs 0.5–1 mm long, scattered-hairy beneath and along margin, dense-hairy along midrib and on petiole with hairs 1.5–3.0 mm long, to scattered-hairy as a whole; cauline leaves 2–3(–
262 4) (coefficient of leafiness 0.06), bottom leaves like basal, lanceolate, short-petiolate, often coarsely long-toothed at base of lamina, others abruptly reduced, narrower, tapered to cuneate base, long-acuminate, upper leaves linear, somewhat stellate-hairy beneath. Inflorescence openly paniculate, with 2–10 capitula; peduncles glabrous, to sparsely glandular, grayish-tomentose. Involucres 9–10 mm long; ovate;

involucral bracts somewhat narrow, subacute, dark, glabrous, with scattered, 35(17–48), glands 0.5–1.0 mm long, outer bracts somewhat stellate-hairy along margin. Stigmas dark. Flowering June to August.

Pine forests below terminal moraines, subalpine meadows.—*Caucasus*: Ciscaucasia, Eastern and Western Transcaucasia. Endemic. Described from Teberda. Type in Tbilisi; paratype in Leningrad.

299. **H. cereolinum** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 722 pro ssp.; Zahn in Pflzr. IV, 280, 446 (nota).—*H. basifolium* (Fr.) Almqu. in Dahlst. Bidr. Sydöstr Sverig. Hier.-Fl. III (1894) 38, ex parte; Samuelsson, Maps of Scand. Hier. sp. No. 74, p. p. quidem pl. karel.—**Exs.**: Norrl. Hier. exs. fasc. VIII, No. 65.

Perennial. Stem 40–60 cm high, 1.5 mm in diameter, violet at base, sparsely hairy, with occasional glands above. Basal leaves 3, obovate to lanceolate, tapered to long petiole, short-acuminate, with 6–9 fine, serrate teeth, glabrous above, sparsely hairy beneath and along margin with hairs 1 mm long, densely hairy along midrib, as a whole scattered-hairy, grayish-green, paler beneath; cauline leaves 2–3 (coefficient of leafiness 0.05), lanceolate, bottom leaf long-petiolate, middle short-petiolate, like basal leaves, upper linear, entire, more or less bracteiform, slightly stellate-hairy beneath. Inflorescence dichotomously paniculate (flabellate), with 4–6 capitula; peduncles glabrous (or with occasional hairs), with occasional fine glands, scatteredly stellate-hairy. Involucres 10 mm long, truncate; involucral bracts narrow, subobtusate, light green, with pale border, glabrous, with scattered, 40(36–44), fine yellowish-brown, well-developed glands 0.5 mm long, outer bracts stellate-hairy at base. Corollas pale yellow; stigmas yellow. Flowering July to August.

Meadows, edges of ditches.—*European Part*: Karelia-Lapland, Ladoga-Ilmen (northern part). Endemic. Described from Serdobol (northern end of Lake Ladoga), Type in Helsinki; paratype in Leningrad.

Note. Norrlin (op. cit.) considered this plant a subspecies of the collective *H. basifolium* (Fr.) Almqu., and it also is the only representative of this species in our country. This situation gave Samuelsson the basis to include it on the distribution map of *H. basifolium* (op. cit.).

H. cereolinum Norrl. is very close to *H. caespiticola* Norrl., differing from the latter mainly by having light-colored involucre, somewhat stellate-hairy involucral bracts, yellow stigmas, hairier leaves, and only occasional glands on the peduncles.

263 300. **H. arcuatidens** Zahn, Hier. fl. Mosquens. (1911) 66; Zahn in Pflzr. IV, 280, 365.— **Ic.**: Syreistsch. III. Fl. Mosk. Gub. III, 365.

Perennial. Stem 25–70 cm high, 1.0–3.5 mm in diameter, sulcate, with occasional hairs in lower half, occasional glands above. Basal leaves 3–4(1–7), elliptical to broadly lanceolate, quite abruptly tapered to long petiole, short-acuminate, to 20 cm long (4.5:1), with small unequal teeth, sometimes running down to petiole, dark green, paler beneath, scattered to more or less dense short hairs 0.6–1.0 mm long on both sides and along margin, with dense hairs 1–2 mm long along midrib beneath, as a whole moderately (to densely) hairy; cauline leaves 2–4 (coefficient of leafiness 0.06), lanceolate, bottom leaf tapered to fairly long petiole, others short-petiolate or sessile, short-acuminate, with 4–6 remote, bulbiform-concave, acute, unevenly alternating large and small teeth. Inflorescence paniculate, with 17(2–32) capitula; peduncles glabrous, with sparse to scattered glands 0.3–0.6 mm long, densely tomentose. Involucres 8.5–10.5 mm long; involucre bracts lanceolate, acute, glabrous, with scattered, 35(24–60), fine but well-developed glands 0.5–1.0 mm long, more or less without stellate hairs. Stigmas dark. Flowering June to August.

Pine and spruce forests.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Volga, Volga-Kama. Endemic. Described from Moscow Region (former Dmitrovsky District). Type in Leningrad.

301. **H. petrofundii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 500.

Perennial. Stem 70 cm high, 3 mm in diameter, with up to short, scattered pubescence, eglandular. Basal leaves 1–2, lanceolate, tapered to long petiole, acute, scarcely denticulate (entire at first glance), to 18 cm long (4:1), yellowish-green, with sparse hairs 0.3 mm long above, scattered-hairy along margin and beneath, hairs 0.8 mm long, with dense hairs along midrib beneath 1 mm long, as a whole moderately hairy; cauline leaves 5 (coefficient of leafiness 0.07), lanceolate, evenly distributed, scarcely denticulate, lower leaves petiolate, upper sessile. Inflorescence paniculate with 5–10 capitula; peduncles glabrous or (apical ones) with occasional hairs and sparse glands 0.4 mm long, scattered-tomentose. Involucres short, 8 mm long; involucre bracts linear, acute, glabrous or sometimes (in apical capitulum) with occasional hairs, with scattered, 44(34–60), glands 0.4 mm long, without stellate hairs. Stigmas yellow (turning brown). Flowering July to August.

Collected once in a park.—*European Part*: Ladoga-Ilmen. Endemic. Described from Peterhof (Leningrad Region). Type in Leningrad.

264 It is distinguished from the closely related species *H. arcuatidens* Zahn by its yellow stigmas and nearly entire leaves.

302. **H. epichlorum** Litw. and Zahn in Fedde, Repert. IV (1907) 238, p. p.; Schedae HFR XLII, 22; Zahn in Pflzr. IV, 280, 389 p. p.—**Exs.:** GRF Nos. 2100, 2098 p. min. p.; Zahn, Hier. Europ. No. 356.

Perennial. Stem 30–70 cm high, 1.0–2.5 mm in diameter, sulcate, with occasional (or to scattered) hairs 1.0–2.5 mm long at base, eglandular (sometimes with occasional glands above), somewhat stellate-hairy above. Basal leaves 3(0–5), often withering before anthesis, lanceolate or oblong-lanceolate, short- or long tapered to winged petiole, acuminate, to 18 cm long (5:1), with 3–5 long (5–10 mm) and short alternating teeth, entire toward tip, grassy-green above, paler beneath, with sparse hairs 0.5–1.0 mm long above and along margin, hairs 1.0–1.5 mm long beneath, to densely hairy along midrib beneath, hairs 1.5 mm long, as a whole to scattered-hairy. Cauline leaves 2–7 (coefficient of leafiness on average 0.06), gradually reduced, lanceolate, bottom leaves tapered to short petiole, others tapered to sessile, base, 3–6 toothed, pubescence as in inner basal leaves, upper leaves with stellate hairs beneath. Inflorescence paniculate, with 2–13 capitula; peduncles glabrous (less often with occasional hairs), with occasional to sparse glands 0.3–0.6 mm long, scattered-tomentose. Involucres 8.0–10.5(–12.5) mm long, ovate, later truncate; involucral bracts lanceolate, acuminate, dark green, with pale border, glabrous, with scattered, 30(14–45), glands 0.5–1.0 mm long, slightly stellate-hairy along margin. Stigmas yellowish-brown, later turning dark. Flowering June to August.

Edges of montane forests, mountain slopes, subalpine meadows and moraines, at 1000–2900 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia, Western Transcaucasia (Teberda). Endemic. Described from Zheleznovodsk Region. Type in Leningrad.

303. **H. fariniramum** Ganesch. and Zahn in Tr. Pochv.-Bot. E'ksp. Peresel, Upr. II, 5 (1912) 151, em Juxip.

265 Perennial. Stem 25–60 cm high, 1–3 mm in diameter, sulcate, violet at base, more or less glabrous or with occasional hairs 1.0–2.5 mm long, above conspicuously stellate-hairy, eglandular. Basal leaves 4(1–7), outer small, obovate, attenuate to short petiole, obtuse to sinuate, inner lanceolate, elongated into long petiole, to 20 cm long (6:1), acute, at first glance more or less entire (in shape resembling leaves of *Succisa pratensis* Moench.) or scarcely denticulate or (less often) with 3–9 pairs of acute teeth to 5 mm long, grassy-green, paler beneath or sometimes violet, with sparse to scattered hairs 0.5–1.0 mm long on both sides and along margin, to densely hairy beneath along midrib and on petiole, as a whole pubescence scattered to moderate; cauline leaves (1–)2(–3) (coefficient of leafiness 0.05), narrowly lanceolate,

short-tapered to petiole, like inner basal leaves, upper leaf linear, bracteiform, beneath or on both sides somewhat stellate-hairy. Inflorescence paniculate, with 5(2–11) capitula; peduncles (almost) glabrous, with sparse glands 0.5 mm long, whitish-tomentose. Involucres 8–10(–11) mm long, ovate; involucral bracts narrow, acute, barbate, grayish-green with pale border, glabrous, with scattered (to moderate), 43(20–60), glands 0.5–1.0 mm long, at base and along margin conspicuously stellate-hairy. Corollas golden yellow; stigmas yellowish-brown. Flowering July to August. (Plate XXV, Fig. 2.)

Pine, birch-pine, birch-aspen and larch forests along ridges, along mountain cranberry-bilberry thickets in taiga, in mixed forests on burns riverine meadows.—*Western Siberia*: Ob' Region Upper Tobol; *Eastern Siberia*: Angara-Sayans, Yenisei, Lena-Kolyma. Endemic. Described from Balagan District. Type in Leningrad.

Note. Zahn (l. c.) mistakenly reports the number of capitula as 10–20; in the quite extensive material of the Herbarium of the Botanical Institute of the Academy of Sciences of the USSR, we were unable to see any plant with more than 11 capitula.

304. **H. virenticeps** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III (1849) 53; Dahlst. Beitr. Hier. Fl. Oesels, 40; Zahn in Pflzr. IV, 280, 455; Asch. and Graebn. Synopsis, XII, II, 694; nec Norrl. (1912).—**Exs.**: Dahlst. Herb. Hier. Scand. cent. II, No. 33.

Perennial. Stem 35–70 cm high, 1.0–1.5 mm in diameter, glabrous, with occasional hairs at base. Basal leaves 2–5, large, obovate, round-obtuse or broadly lanceolate, more or less abruptly narrowed or gradually tapered to long petiole, to 23 cm long (4:1), broadly and remotely crenate (large teeth alternating with small), glaucescent, pale and often violet beneath, glabrous on both sides or with occasional hairs beneath, along margin and midrib and as a whole sparsely hairy; cauline leaves 2–4 (coefficient of leafiness 0.06), lanceolate, large, bottom leaf tapered to long petiole (like inner basal leaf), others sessile, with narrowed base, in lower half coarsely (broadly or deeply) toothed; more or less glabrous. Inflorescence openly paniculate, with 3–10 capitula; peduncles glabrous, with occasional glands, weakly tomentose. Involucres (9–)10–11 mm long; involucral bracts glabrous with scattered, 34(21–53), glands to 0.7 mm long, stellate-hairy only along margin. Stigmas yellow. Flowering July.

Along forested moraines.—*European Part*: Baltic Region (Estonian SSR). *General distribution*: Scandinavia. Described from Sweden. Type in Stockholm.

- 266 305. **H. anfractum** Fr. in Vet.-Ak.-Förh. (1856) 148; Epicr. 100 p. max p.; Zahn in Pflzr. IV, 280, 385; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 622, nec, Sagor. and Schneider (1891); nec Oborny (1905).—*H. euanfractum* Zahn in Asch. and Graebn. Synopsis, XII, II (1934) 577.—**Exs.:** Fr. Herb. norm. XVI, No. 10; Hier. Europ. No. 48; Lbg. Hier. Scand. exs. No. 133; Dahlst. Hier. Scand. cent. II, Nos. 61, 62, XI, No. 70; Hier. exs., fasc. II, No. 69; GRF No. 2099.

Perennial. Stem 35–65 cm high, to 3 mm in diameter, sulcate, somewhat hairy at base, glabrous above, eglandular, in upper part weakly tomentose. Basal leaves 2(1–4), outer often withering before anthesis, oblong-elliptical to lanceolate, cuneately narrowed to long, winged petiole, acuminate, with 5–7 acute, broad and narrow, short and long teeth, on both sides with scattered hairs 1 mm long, with occasional hairs 0.6–0.8 mm long along margin. densely hairy beneath along midrib and on petiole with hairs 1.0–1.5 mm long, as a whole to moderately hairy, light- or grassy-green, paler beneath; cauline leaves 2–6 (coefficient of leafiness on average 0.07), lanceolate, abruptly narrowed to petiole, at base dissectedly sharp-toothed (a short tooth between two long teeth), upper leaves sessile, with narrowed base, linear-lanceolate, entire. Inflorescence paniculate, at top more or less umbellate, with 3–12 capitula; peduncles without simple hairs but with scattered glands 0.3–0.5 mm long, quite white-tomentose. Involucres 8–9 mm long, ovate, later truncate; involucral bracts somewhat broad, deltoid-lanceolate, blackish-green with dark tip, subobtusate, glabrous (sometimes with occasional longer gray and short black hairs), with scattered, (28–38), glands 0.5 mm long, more or less without stellate hairs. Stigmas always dark to black. Flowering June to August.

Edges of montane deciduous forests, herb slopes, subalpine meadows.—*Caucasus:* Ciscaucasia. *General distribution:* Scandinavia, Central Europe. Described from Sweden. Type in Uppsala.

Note. It is doubtful that the Caucasian and the European plants are the same. The issue needs special study.

306. **H. caespiticola** Norrl. Herb. Mus. Fenn. ed. 2 (1889) 149; in Brenn. Finl. Hier.-form. II, 33; in Mela-Cajander, Suom. Kasvio, 723; Zahn in Pflzr. IV, 280, 381 (nota); Samuelsson, Maps of Scand. Hier. sp. No. 78.—**Exs.:** Norrl. Hier. exs. fasc. VIII, Nos. 77–79.

Perennial. Stem 20–65 cm high, 1–4 mm in diameter, reddish-violet at base and sparsely covered with hairs 1.5–2.5 mm long, with occasional glands above. Basal leaves 1–5, lanceolate to narrowly lanceolate, to 20 cm long (6–7:1), narrowed to long, slender petiole, acuminate, very finely serrate, glabrous above, with sparse hairs 0.5–1.0 mm long beneath and along margin, scatteredly along midrib, as a

whole sparsely hairy, glaucescent, paler or violet beneath; cauline leaves 3(2–5) (coefficient of leafiness 0.06), narrowly lanceolate, short-petiolate to sessile, acute, other characters as in basal leaves. Inflorescence paniculate, with 3–13 capitula; peduncles glabrous, with scattered glands 0.4 mm long, with scattered stellate hairs. Involucres 8–9(–11) mm long; involucre bracts narrow, subacute, dark, glabrous, with scattered, 40(25–55), yellowish-brown glands 0.2–0.5 mm long, more or less without stellate hairs. Stigmas dull green, dark. Flowering June to August.

Hummocky meadows, on wet turfy soil.—*European Part*: Karelia-Lapland, Dvina-Pechora. *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki; paratype in Leningrad.

307. **H. festinum** Jord. ex Bor. Fl. Centre France, ed. 3, II (1857) 399; Sudre, Hier. du Centre de la France (1902) 56; Zahn in Pflzr. IV, 280, 376; Asch. and Graebn. Synopsis, XII, II, 560.—**Ic.**: van Soest. in Nederl. Kruidkund. Archief. (1925), fig. 29.

Perennial. Stem 30–80 cm high, 1.5–3.0 mm in diameter, with occasional hairs, more or less glabrous, eglandular. Basal leaves to 4, outer elliptical-spatulate, inner ovate-lanceolate to lanceolate, tapered to long petiole (4–5:1), serrate, obtuse to acute, glabrous above, sparsely hairy beneath and along margin with hairs 1.0–1.5 mm long, with scattered hairs 2 mm long beneath along midrib, as a whole sparsely hairy; cauline leaves 3–5 (coefficient of leafiness 0.07), lanceolate, acute, more or less distinctly sharply serrate (teeth 2–3 mm long), short-tapered to petiole, upper leaves sessile, hairs sparser than on basal leaves. Inflorescence openly paniculate, with 2–3 capitula; peduncles glabrous, with occasional glands 0.3 mm long, with scattered stellate hairs. Involucres 9–12 mm long, ovate; involucre bracts somewhat narrow, somewhat obtuse to acute, blackish-green, with pale border, glabrous, scatteredly (40) glandular, glands 0.5 mm long, more or less without stellate hairs. Style and stigmas yellow, but forms (e.g., Caucasian plants) with dark style and stigmas also found (var. *obsturistylum* Tout.). Flowering July to August.

Montane forests.—*European Part*: Upper Dniester; *Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Mediterranean, Balkans-Asia Minor. Described from France. Type in Lyons.

Cycle 7. Argillaceoidea Juxip.—Involucre bracts moderately glandular; coefficient of leafiness 0.07–0.03.

308. **H. siworkae** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 500.

268 Perennial. Stem 40–55 cm high, 1.5–3.0 mm in diameter, more or less glabrous, sometimes with occasional glands above. Basal leaves mostly withering before anthesis, 0–2, broadly lanceolate, attenuate to long petiole, to 20 cm long (5:1), toothed, sometimes with free teeth along petiole, with sparse hairs 0.5–1.0 mm long on both sides and along margin, moderately hairy beneath along midrib, as a whole with scattered hairs; cauline leaves 3–4 (coefficient of leafiness 0.06), lanceolate, lower short-petiolate, upper sessile, with 4–6 teeth (densely hairy along midrib beneath). Inflorescence paniculate, with 3–8 capitula; peduncles glabrous, or rarely with occasional hairs, with occasional glands, tomentose. Involucre 9–10 mm long; involucre bracts linear, subobtusate or acute, glabrous, to moderately, 54(40–60), glandular with glands 0.5–1.0 mm long, at base somewhat stellate-hairy. Stigmas dark. Flowering July to August.

Banks of streams and lakes, in parks.—*European Part*: Karelia-Lapland, Dvina-Pechora, Ladoga-Ilmen. Endemic. Described from Leningrad Region (Suida station, near Gatchina). Type in Leningrad.

Note. Distinguished from the quite closely related species *H. violascentiforme* Pohle and Zahn by its occasional glands on the peduncles, weakly stellate-hairy (at base) involucre bracts, and denser, pubescence of the leaves, particularly conspicuous along midrib beneath.

309. ***H. subfariniramum*** Ganesch. and Zahn in Tr. Pochv.-Bot. E'ksp. Perecel. Upr. II, 5 (1912) 152.

Perennial. Stem 30–45 cm high, 1–2 mm in diameter, sulcate, violet at base, with occasional hairs 1.0–1.5 mm long, white-tomentose above, more or less eglandular. Basal leaves (1–)3, lanceolate, outer oval, subobtusate, attenuate to short petiole, inner lanceolate tapered to more or less long petiole, subacute, to 16 cm long (6:1), remotely denticulate, grassy-green, paler beneath, more or less glabrous above, with scattered hairs beneath and along margin, hairs 0.3–1.0 mm long, as a whole pubescence scattered; cauline leaves (1–)2–4 (coefficient of leafiness 0.07), lanceolate, acute, lower attenuate to petiole, upper sessile, crenate (with 2–3 larger teeth to 5 mm long near base), somewhat stellate-hairy beneath, mainly along midrib. Inflorescence openly paniculate, with 2–4(–7) capitula; peduncles glabrous, with sparse glands 0.5 mm long, tomentose. Involucres 8.5–9.5 mm long, ovate; involucre bracts somewhat broad, subacute, dark green with broad, green border, glabrous, with scattered, 44(37–55), glands 0.5–0.6 mm long, more or less without stellate hairs. Stigmas dark. The species is quite close to *H. fariniramum* Ganesch. and Zahn, from which it is

distinguished only by its dark stigmas and almost complete absence of stellate hairs on the involucre bracts. Flowering July to August.

- 269 Taiga forests and thickets in alpine tundra.—*Eastern Siberia*: Angara-Sayans, Lena-Kolyma. Endemic. Described from Balagan District. Type in Leningrad.

310. **H. violascentiforme** Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 142; Zahn in Pflzr. IV, 280, 381.

Perennial. Stem 30–50 cm high, 1–2 mm in diameter, more or less glabrous, with occasional glands above, with scattered stellate hairs. Basal leaves 3–6, lanceolate, attenuate to petiole, acuminate, with remote teeth, yellowish-green, mostly glabrous above, with occasional hairs beneath, with scattered short-pubescent along margin and beneath along midrib, as a whole sparsely hairy; cauline leaves 2–3 (coefficient of leafiness 0.05), lanceolate, short-petiolate, stellate-hairy beneath, upper cauline leaf sessile, on both sides stellate-hairy. Inflorescence paniculate, with 2–5 capitula (to 25 ! in Zahn's diagnosis); peduncles glabrous, sparsely glandular, with 0.5–1.0 mm long glands, grayish- or white-tomentose. Involucres 9–11 mm long, ovate; involucre bracts somewhat broad, subacute, dark, glabrous, moderately, 50(30–60), glandular, glands 0.5–1.0 mm long, along margin stellate-hairy. Stigmas dark. Flowering July to August.

Forests and scrubs.—*European Part*: Karelia-Lapland, Dvina-Pechora. Endemic. Described from Arkhangelsk Region (Letniy Orlov on coast of White Sea). Type in Leningrad.

311. **H. argillaceoides** Litw. and Zahn in Fedde, Repert. IV (1907) 239; Zahn in Pflzr. IV, 280, 365; nec Benz. and Zahn (1911).

Perennial. Stem (20)30–70 cm high, 1.0–3.5 mm in diameter, sparsely hairy below, with occasional glands above. Basal leaves 3–5(–8), ovate or oblong-lanceolate, subobtusate or short-acuminate, attenuate to short or long petiole, more or less serrulate, entire toward tip, scattered-hairy above and along margin with hairs 0.5–1.0 mm long, moderately hairy, beneath but along midrib densely so with hairs 1.5 mm long, as a whole moderately hairy, light grassy-green; cauline leaves 2–4(–7) (coefficient of leafiness 0.06), remote, gradually reduced, lanceolate, lower tapered to petiole, upper sessile, more distinctly toothed, sparsely stellate-hairy beneath. Inflorescence paniculate, with 2–9(–20) capitula; peduncles glabrous, with scattered to moderate fine glands 0.3–0.7 mm long, grayish-tomentose. Involucres (7.5–)9.0–10.5 mm long, ovate; involucre bracts narrow, obtuse, with narrow pale margin, glabrous with glands to moderate, 53(30–75), 0.3–1.0 mm long, at base distinctly stellate-hairy. Stigmas yellow, later turning brown. Flowering June to August.

Open montane forests, subalpine meadows, moraines and rubbly-rocky slopes, at 600–2600 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from Pyatigorsk Region (the Mashuk Mountain). Type in Leningrad.

- 270 312. **H. guentheri** Norrl. Herb. Mus. Fenn. ed. 2 (1889) 148; Norrl. in Mela-Cajander, Suom. Kasvio, 711; Zahn in Pflzr. IV, 280, 451 (nota).—**Exs.**: Norrl. Hier. exs. fasc. VIII, Nos. 3–5.

Perennial. Stem 30–50 cm high, 1.5 mm in diameter, violet at base, sparsely covered with hairs 2 mm long, without hairs but with occasional glands above. Basal leaves 2–5, broadly lanceolate, attenuate to long petiole, acute (4:1), with 5–9 unequal sharply serrate teeth, light green, sparsely hairy above along margin and beneath with hairs 1.0–1.5 mm long, densely hairy along midrib beneath with hairs 2 mm long, as a whole pubescence to scattered, with stellate hairs beneath along midrib; cauline leaves 1–3 (coefficient of leafiness 0.04), lanceolate, short-petiolate or upper leaves sessile, with unequal, sharp teeth, on both sides stellate-hairy, as a whole moderately hairy (but glabrous above). Inflorescence paniculate, with 10 capitula; peduncles glabrous (or with occasional hairs), with sparse to scattered glands 0.3–0.4 mm long, grayish-tomentose. Involucres 8.5–10.0 mm long; involucre bracts linear, narrow, glabrous or with occasional hairs, moderately, 58(50–60), glandular with glands 0.4–0.5 mm long, sparsely stellate-hairy at base and along margin. Stigmas dark. Flowering August.

Roadsides, moraines.—*European Part*: Karelia-Lapland, Dvina-Pechora. Endemic. Described from Olonets Region. Type in Helsinki; partatype in Leningrad.

Note. Although in his diagnosis Norrlin mentions the presence of hairs on the involucre bracts and peduncles, we could not find them on the specimens studied by us.

313. **H. silenii** Norrl. in Acta Soc. Fa. and Fl. Fenn. VIII (1871) 135 in nota; Norrl. in Mela-Cajander, Suom. Kasvio, 711; Zahn in Pflzr. IV, 280, 456; Samuelsson, Maps of Scand. Hier. sp. No. 105.—**Exs.**: Norrl. Hier. exs. fasc. VIII, Nos. 1, 2; GRF No. 1848; Zahn Hier. Europ. No. 465.

Perennial. Stem 30–80 cm high, 1.5–3.0 mm in diameter, reddish at base, pubescent to sparse, with occasional glands above and somewhat stellate-hairy, often branched. Basal leaves 3(1–6), obovate, spatulate, obtuse to elliptical or lanceolate, attenuate to long petiole, subobtusely to acute, to 22 cm long (6:1), remotely finely crenate to almost entire, grassy-yellowish-green, paler beneath and sometimes



273 violet, more or less glabrous above to scattered-hairy beneath and along margin with hairs 0.5–1.0 mm long, densely hairy along midrib beneath, as a whole to scattered-hairy; cauline leaves 3–4(2–5) (coefficient of leafiness 0.05), oblong-lanceolate, lower petiolate, upper narrowly lanceolate, sessile, acute, somewhat stellate-hairy beneath. Inflorescence paniculate, with 4–18 capitula; peduncles glabrous, with scattered glands 0.5 mm long, scattered-tomentose. Involucres (7.5)8.0–9.5 mm long; involucre bracts somewhat broad, deltoid-lanceolate, subobtusate, glabrous, moderately, 48(46–50), glandular with glands 0.5 mm long, outer bracts conspicuously stellate-hairy, particularly along margin. Stigmas ginger-colored, turning dark. Flowering June to August.

Meadow slopes, forest edges.—*European Part*: Karelia-Lapland, Ladoga-Ilmen. *General distribution*: Scandinavia (Finland). Described from Finland. Endemic. Type in Helsinki; paratype in Leningrad.

Cycle 8. Umbrosa Juxip.—Involucral bracts with only glands, to dense; coefficient of leafiness 0.07–0.03.

314. **H. umbrosum** Jord. Cat. Dijon (1848) 24; Zahn in Pflzr. IV, 280. 793; non Schur. (1866); nec Uechtr. (1866); Zahn (1901).—*H. eu-umbrosum* Zahn in Asch. and Graebn. Synopsis, XII, III (1930) 346.—*H. integrifolium* Lange, Handb. Danske Fl. 1, I (1851) 456.—*H. integrifolium* Zahn, Hier. Schweiz. 2, II (1905) 478.

Perennial. Stem 30–70 cm high, distinctly hairy at base with hairs 1.0–2.5 mm long, violet, glandular above. Basal leaves 3–6, often large, outer broadly ovate, more or less obtuse, inner oblong-lanceolate, abruptly or gradually tapered to long petiole, scarcely toothed to more or less entire (var. *integrifolium* Zahn) or more or less distinctly toothed, acute, light to dark green, pale-glaucous beneath, to moderately (densely along midrib beneath and on petiole) hairy; cauline leaves 2–4 (coefficient of leafiness 0.06), lanceolate, bottom leaf tapered to short, winged petiole, others sessile, somewhat amplexicaul, scarcely toothed, along margin with rare small glands, upper leaves somewhat stellate-hairy beneath. Inflorescence openly paniculate, with few capitula; peduncles glabrous densely glandular, tomentose. Involucres 10–11 mm long, ovate; involucre bracts somewhat narrow, obtuse to subacute, grayish-green, glabrous, densely glandular, along margin stellate-hairy. Ligules more or less ciliate; stigmas dark; achenes reddish-brown, not black. Flowering July to August.

Mountains, 1000–2400 m.—*European Part*: Upper Dniester (Carpathian Mountains). *General distribution*: Scandinavia, Central Europe, Mediterranean Region, Balkans-Asia Minor (Balkans). Described from France. Type in Lyons.

Note. Only var. *integrifolium* Zahn is found in our country.

Subsection 4. *Diaphanoidea* Juxip.—Zahn in Pflzr. IV, 280 (1921) 349 (ut sp. coll.); Asch. and Graebn. Synopsis; XII, II, 486.—Characters given in key; coefficient of leafiness 0.06 (0.02–0.11), i.e., cauline
274 leaves 1 to 9; basal leaves at anthesis 1 to 9; inflorescence more or less corymbose-paniculate; involucre bracts and peduncles densely glandular with large glands, glabrous or (in a few species) with occasional hairs. Pollen does not develop.

Range: Almost all of Europe; found more rarely toward the east.

Note. One of the “stumbling blocks” in the identification of hawkweeds is the difficulty in differentiating species of very similar habit but belonging either to subsection *Vulgata* or to *Diaphanoidea*. Here the statistical method of investigation used by us has shown good results. In the analysis of the large amount of material, a curious pattern is revealed: the total number of glands in the inflorescence of the species of subsection *Diaphanoidea* is 2–3 times higher than that of the species of subsection *Vulgata*. Thus, it logically follows that there is no need to count all the glands on a plant, but it is enough to add up the number of glands present on a single involucre bract, a 5 mm-section of the peduncle, and a similar section of the stem (immediately below inflorescence; see note to the description of the genus, p. 5). If the sum (“index”) obtained in this manner is on the average equal to 40(20–60), then we are dealing with a species of subsection *Vulgata*, but if it is, e.g., 100(70–160(250)), then undoubtedly the species belongs to subsection *Diaphanoidea*. This character correlates with size of gland: medium—0.5(0.4–0.6) mm in length—in subsection *Vulgata* and long—1.0(0.7–1.2(1.5)) mm in length—in subsection *Diaphanoidea*.

1. Involucre bracts with hairs and glands.....2.
- + Involucre bracts with glands only.....8.
2. Number of hairs and glands on involucre bracts more or less equal; in habit plants resemble species of subsection *Vulgata* but distinguished by abundance of glands; hairs on leaves along midrib beneath 2.5–3.0 mm long.....315. **H. inconveniens** Juxip
- + Number of glands on involucre bracts several times greater than of hairs.....3.
3. Involucre bracts with sparse hairs (ratio of hairs to glands 30:70); peduncles distinctly glandular.....316. **H. kuzenevae** Juxip
- + Involucre bracts with occasional hairs (ratio of hairs to glands 5:95).....4.
4. Glands on involucre bracts moderate in number.....5.

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- + Glands on involucre bracts (as well as on peduncles) dense; leaves at first glance almost entire, densely pubescent; plants of Baltic Region.....321. **H. leibertii** Zahn
- 5. Involucres more or less large (10.0–11.5 mm long); pubescence of leaves scattered to moderate.....6.
- + Involucres small (8–9 mm long); involucre bracts distinctly stellate-pubescent; stigmas yellow (turning brown); leaves densely pubescent.....320. **H. kubinskense** Juxip
- 6. Stigmas dark.....7.
- + Stigmas yellow, later turning brown; involucre bracts distinctly stellate-pubescent; plants of Caucasus.....
-319. **H. leptogrammoides** Juxip
- 7. Basal leaves absent at anthesis or one leaf, long-attenuate to petiole; cauline leaves 4–5; plants of Kola Peninsula.....
-317. **H. pasense** Juxip
- + Basal leaves 2–4, broad (3:1), abruptly or truncately tapered to petiole; cauline leaves 2–3; plants of Caucasus.....
-318. **H. sbaense** Juxip
- 8 (1). Plant with high coefficient of leafiness unusual for subsection, on average 0.15–0.10.....9.
- + Plant with coefficient of leafiness normal for subsection (0.08).0.6–0.03.....11.
- 9. Involucre bracts moderately glandular.....10.
- + Involucre bracts very densely glandular; peduncles sparsely glandular; leaves moderately pubescent; plants of Baltic Region.....
-322. **H. nesaeum** Juxip
- 10. Leaves densely pubescent; involucres small (9 mm long); stigmas yellow; cauline leaves 4, broad; stem sparsely pubescent; plants of Carpathian Mountains.....324. **H. mukacevense** Juxip
- + Leaves very densely pubescent; involucres large (11–12 mm long); stigmas dark; cauline leaves 4–8; stem moderately pubescent; plants of Baltic Region.....323. **H. valmierense** Juxip
- 11 (8). Involucre bracts moderately to densely (45–90) glandular.....12.
- + Involucre bracts densely (80–110) glandular.....18.
- 12. Stigmas yellow; leaves scattered-pubescent.....13.
- + Stigmas dark or rusty.....14.
- 13. Peduncles sparsely glandular. Involucres 9–10 mm long; involucre bracts distinctly stellate-pubescent. Leaves denticulate; plants of European Part of the Soviet Union...325. **H. submedianum** Zahn
- + Peduncles moderately glandular. Involucres 11 mm long; involucre bracts more or less without stellate hairs. Leaves almost entire; plants with 2–5 stems; plants of Western Siberia.....326. **H. pluricaule** Schischk. and Serg.

14. Involucral bracts more or less without stellate hairs.....15.
 + Involucral bracts distinctly stellate-hairy.....16.
- 276 15. Peduncles with sparse to scattered glands; leaves moderately pubescent; involucre more or less large (10–12 mm long); stigmas rusty, later turning dark; leaves with many teeth; stem almost glabrous.....327. **H. diaphanoides** Lindeb.
 + Peduncles moderately glandular; leaves densely pubescent on both sides; involucre 8.5–10.5 mm long; leaves scarcely denticulate; stem with scattered pubescence; plants of the North.....328. **H. ischnoadenum** Juxip
16. Leaves to scattered-pubescent; involucral bracts narrow; quite acute; pappus dull white.....329. **H. subpellucidum** Norrl.
 + Leaves moderately to densely pubescent.....17.
17. Leaves moderately pubescent; involucral bracts somewhat broad; pappus snow-white.....330. **H. subarctoum** Norrl.
 + Leaves densely pubescent; involucral bracts linear, abruptly triangular-acuminate; stem sparsely hairy.....331. **H. ornatum** Dahlst.
- 18 (11). Peduncles sparsely to scatteredly glandular.....19.
 + Peduncles moderately to densely glandular.....23.
19. Leaves (as well as stem) sparsely pubescent; stigmas dark; plants of the Urals.....332. **H. schellianum** Juxip
 + Leaves moderately to densely pubescent.....20.
20. Leaves moderately pubescent.....21.
 + Leaves very densely pubescent; stigmas dark.....22.
21. Stigmas yellow; involucral bracts distinctly stellate-hairy; leaves almost entire; plants of Western Siberia.....333. **H. taigense** Schischk. and Serg.
 + Stigmas dark; involucral bracts with sparse stellate hairs along margin; leaves with many unequal teeth; plants of Kola Peninsula.....334. **H. apatitorum** Juxip
22. Involucral bracts more or less without stellate hairs; leaves serrulate; cauline leaves 4–5; plants of Carpathian Mountains.....335. **H. igoschinae** Juxip
 + Involucral bracts densely stellate-hairy; leaves almost entire; cauline leaves 1–2; plants of the North.....336. **H. bobrovii** Juxip
- 23 (18). Peduncles moderately glandular; leaves moderately pubescent; involucre more or less large, 10–12 mm long; stigmas dark; plants of Caucasus.....337. **H. debilescens** Woron. and Zahn
 + Peduncles densely glandular (as a whole glandularity of inflorescence unusually high); leaves densely pubescent; involucre small (9.5 mm long); stigmas yellow; plants of Kola Peninsula.....338. **H. subbuletorum** Juxip

Cycle 1. Aliena Juxip.—Hairs and glands on involucre bracts in equal abundance, scattered.

277 315. **H. inconveniens** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 500.

Perennial. Stem 50–75 cm high, 2.5 mm in diameter, scattered pubescent throughout, scattered-glandular above. Basal leaves 5–7, rosulate, broadly lanceolate, more or less abruptly or gradually tapered to petiole, large, to 20 cm long (4.5:1), with unequal, acute (recurved), teeth (to 10 mm long), with free teeth on petiole, short-acuminate, olive-green, covered above with scattered hairs 1 mm long, beneath and along margin pubescence to dense, hairs 1.0–1.5 mm long, very dense along midrib beneath, hairs 2.5–3.0 mm long, as a whole densely pubescent; cauline leaves 1–3 (coefficient of leafiness 0.03), lanceolate, short-petiolate, or (upper leaves) sessile, deeply and unevenly sharp-toothed, with free teeth along petiole, acuminate, pubescence denser than on basal leaves. Inflorescence paniculate-umbellate, with 10–18 capitula; peduncles with occasional hairs, moderately glandular, with scattered stellate hairs. Involucres 10.5–11.5 mm long; involucre bracts narrow, acute, with scattered 35(20–45) hairs 1.5 mm long and similarly scattered, 15(40–50), glands 0.5–0.6 mm long, more or less without stellate hairs. Stigmas dark. Flowering July.

Edges of forests, forested slopes.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Estonian SSR (Khageri). Type in Tartu.

Note. It is an intermediate form linking subsections *Vulgata* and *Diaphanoides*; it is similar to the first subsection in habit and medium size of glands and to the second in abundance of glands even in the upper part of the stem. The long hairs on the leaves along the midrib beneath are characteristic.

Cycle 2. Kuzenevaea Juxip.—Involucre bracts sparsely hairy but moderately glandular (ratio of hairs to glands 30:70); peduncles densely glandular; coefficient of leafiness low (0.02), i.e., cauline leaves one.

316. **H. kuzenevae** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 501.

Perennial. Stem 35–70 cm high, 2 mm in diameter, violet at base, more or less glabrous, sparsely glandular above. Basal leaves 3–5, oval, obvate to lanceolate, quite abruptly narrowed to very long petiole, subobtusate to short-acuminate, to 26 cm long (5.5:1), with unequal, small and conspicuous, acute teeth, teeth very small toward tip, grassy-green, sparsely short-hairy on both sides and along margin with hairs

0.5–1.0 mm long, densely along midrib beneath, hairs 2 mm long, as a whole to moderately pubescent; cauline leaves one (coefficient of leafiness 0.02), lanceolate, abruptly narrowed to petiole, resembling inner basal leaf. Inflorescence paniculate-corymbose, with 3–6 capitula; peduncles with occasional hairs or glabrous but with moderate to
 278 dense glands 0.5–1.0 mm long, with scattered stellate hairs. Involucre 8.5–10.5 mm long; involucre bracts narrow, subobtusate, dark, with sparse (20) hairs 1 mm long, and with moderate, 55(40–70), glands 0.5–1.0 mm long, more or less without stellate hairs. Stigmas dark or black. Flowering August.

Willow-stands, along alpine meadow patches.—*European Part*: Arctic Europe; *Western Siberia*: Arctic Siberia. Described from Murmansk Region (Rybachy Peninsula). Type in Kirovsk.

Note. In habit it resembles the species of subsection *Vulgata* but is distinguished from the latter by the abundance of glands in the inflorescence.

Cycle 3. *Leptogramma* Juxip.—Involucral bracts with occasional hairs and scattered to dense glands (ratio of number of hairs to glands 5:95).

317. ***H. pasense* Juxip** in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 501.

Perennial. Stem to 60 cm high, 3 mm in diameter, reddish-violet at base, more or less glabrous. Basal leaves at anthesis one, oval-lanceolate, long-tapered to petiole, short-acuminate, with 3–4 short teeth, sparsely pubescent; cauline leaves 4–5 (coefficient of leafiness 0.08), lanceolate, bottom leaf attenuate to petiole, resembling basal leaf, others sessile, with obtuse base, acuminate, scarcely toothed to entire, pubescence scattered (glabrous above). Inflorescence dichotomously paniculate, with 5 capitula; peduncles with occasional hairs 1 mm long, and with sparse glands 0.5 mm long, with scattered stellate hairs. Involucre 11 mm long; involucre bracts lanceolate, obtuse, dark, with few (6) hairs 1 mm long, moderately (60) glandular with glands 1.2–0.2 mm long (glands with yellow tips, reduced toward tip), without stellate hairs, barbate. Stigmas dark. Flowering August. (Plate XXIV, Fig. 2.)

Tundra.—*European Part*: Arctic Europe. Endemic. Described from Murmansk Region (banks of Paza River). Type in Leningrad.

Note. It is distinguished from the closely related species of *Leptogramma* by the higher number (4–5) of cauline leaves.

318. ***H. sbaense* Juxip** in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 502.

Perennial. Stem 35–55 cm high, 2.0–2.5 mm in diameter, violet at base, to sparsely hairy, sulcate, with occasional glands above. Basal leaves 2–4, round, elliptical to broadly lanceolate, abruptly and truncately tapered to petiole, to 13 cm long (3:1), scarcely toothed with 4–5 remote teeth, almost entire, sparsely hairy on both sides and along margin, densely so along midrib beneath, as a whole scattered-hairy; 279 cauline leaves 2–3 (coefficient of leafiness 0.06), lanceolate, bottom leaf petiolate, upper sessile, denticulate. Inflorescence paniculate, with 3–12 capitula; peduncles glabrous or with occasional hairs, with sparse glands 0.7–1.0 mm long, tomentose. Involucres 10.0–11.5 mm long; involucre bracts linear, obtuse, with occasional (0–3) hairs, and scattered, 45(40–50), glands 0.8–1.5 mm long, more or less without stellate hairs (latter only at base). Stigmas dark. Flowering June to July. (Plate XXVI.)

Montane spruce forests, subalpine meadows.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from southern Ossetia (Sba Ravine). Type in Leningrad.

Note. It is distinguished from the closely related species *H. leptogrammoides* Juxip mainly by the dark stigmas.

319. ***H. leptogrammoides*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 502.

Perennial. Stem to 50 cm high, 2 mm in diameter, violet at base and sparsely hairy, with occasional glands above. Basal leaves 3, broadly lanceolate, quite abruptly narrowed to petiole, subacute, serrulate (at base teeth somewhat larger) (3.5:1), to moderately hairy; cauline leaves 3–4 (coefficient of leafiness 0.07), lanceolate, broad, lower leaf tapered to short petiole, upper sessile, with expanded base, with 3–5 more conspicuous teeth than in basal leaves, somewhat stellate-hairy beneath along midrib. Inflorescence paniculate, with 5 capitula; peduncles glabrous, sparsely glandular, glands 0.5 mm long, with scattered stellate hairs. Involucres 11.5 mm long; involucre bracts narrow, acute, with few (4–5), hairs 1 mm long and moderate (50–55) glands 0.5–1.0 mm long, distinctly stellate-hairy (particularly at base and along margin). Stigmas yellowish-brown; achenes 3.5 mm long. Flowering July.

Forest edges.—*Caucasus*: ?Southern Transcaucasia. *General distribution*: Eastern Anatolia. Described from former Artvin Region (Barevansky Post—Tsarskoye). Type in Tbilisi.

Note. The type (specimen No. 4875) was identified by Zahn as *H. leptogrammun* Dahlst., but in the monograph (Engl. *Pflzr.* IV, 280, 359) it is referred to as follows: "Ähnlich im Kaukasus: zwischen Barevan u. Tsarskoye (Prov. Batum)!" Although in habit our plant is indeed

similar to the Swedish *H. leptogrammum* Dahlst., it is distinguished from the latter by its dense stellate hairs on the involucre bracts, yellowish-brown stigmas, and range.

320. **H. kubinskense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 503.

280 Perennial. Stem 45–60 cm high, 2 mm in diameter, with occasional hairs, occasional glands above. Basal leaves 2, oblong-lanceolate, long tapered to petiole, acuminate, to 15 cm long (5:1), scarcely denticulate, densely hairy; cauline leaves 2 (coefficient of leafiness 0.04), lanceolate, short-petiolate to sessile. Inflorescence paniculate, with 4–8 capitula; peduncles with occasional hairs and sparse glands 1 mm long. Involucres 8–9 mm long; involucre bracts with occasional hairs 1 mm long or partly glabrous, and with moderate, 62(50–70), glands 1 mm long, distinctly stellate-hairy. Stigmas yellowish-brown. Flowering July.

European Part: Divina-Pechora. Endemic. Described from Vologda Region (near Kubinsky Lake). Type in Leningrad.

Note. Distinguished from the closely related species of *Leptogramma* by its small involucres.

321. **H. lehbertii** Zahn in Herb. Bornmülleri (1925); in Asch. and Graebn. Synopsis, XII, II, 494.

Perennial. Stem 45–55 cm high, 2 mm in diameter, sparsely hairy below with hairs 3–5 mm long, scatteredly glandular above. Basal leaves 4–8, rosulate, obovate, oval to oblong-lanceolate, obtuse to acute, quite abruptly or more or less gradually narrowed to long petiole, to 22 cm long (4:1), scarcely denticulate (at first glance almost entire), grassy-green, lead-gray beneath, sparsely hairy above, moderately so beneath, densely along margin and midrib (as well as on petiole), as a whole to densely hairy, hairs 2–3 mm long; cauline leaves 1(–2) (coefficient of leafiness 0.03), petiolate, lanceolate, with remote, broad teeth in lower half, slightly stellate-hairy beneath. Inflorescence paniculate, with 2–8 capitula; peduncles glabrous or with occasional hairs 1 mm long, densely glandular, with scattered stellate hairs. Involucres 9.5–10.0 mm long; involucre bracts somewhat broad, more or less obtuse to acute, with few (1–3) hairs 1 mm long and dense (80) glands 0.7 mm long, more or less without stellate hairs. Stigmas dark. Flowering July.

Coniferous forests.—*European Part:* Baltic Region. Endemic. Described from Kyasmu (Kasparvik), Estonian SSR. Type in Tallin.

Cycle 4. Nesaea Juxip.—Involucre bracts with only glands; coefficient of leafiness high for subsection (0.15–0.10), i.e., cauline leaves 4–9.

322. **H. nesaeum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 503.

281 Perennial. Stem 50–65 cm high, 2 mm in diameter, to scattered hairy below, with occasional glands above. Basal leaves 1–4, obovate to oblong-lanceolate, abruptly or more or less gradually tapered to winged petiole, to 20 cm long (5.7:1), serrate, short-acuminate, olive-green, reddish beneath, with sparse hairs 0.5 mm long above, scattered hairy beneath and along margin with hairs 0.6–1.0 mm long, dense along midrib, hairs 0.7 mm long, as a whole moderately hairy; cauline leaves 7–9 (coefficient of leafiness 0.15), lanceolate, lower two leaves with truncate base, upper attenuate to short petiole or sessile, toothed, teeth at base large, 10 mm long, divergent, acute. Inflorescence paniculate, with 7–12 capitula; peduncles glabrous, sparsely glandular, tomentose. Involucres 9.5 mm long; involucral bracts narrow, abruptly acuminate, glabrous, with very dense, 108(85–130), glands 0.5–0.2 mm long (glands reduced toward tip), without stellate hairs. Stigmas dark. Flowering July.

Forested moraines, spruce-pine forest.—*European Part*: Baltic Region. Endemic. Described from Tartu District. Type in Tallin.

Note. It is distinguished from the closely related species by the unusually high (for the subsection) coefficient of leafiness—0.15, i.e., with 7–9 cauline leaves and very densely glandular involucral bracts.

323. **H. valmierense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 504.

Perennial. Stem 65 cm high, 2 mm in diameter, to moderately hairy below, sparsely glandular above. Basal leaves 3, elliptical, rhomboid to lanceolate, more or less abruptly narrowed to short petiole, to 20 cm long, broad (3.5:1) with 4–5 distinct, unequal, asymmetric, coarse and acute teeth concentrated in lower half, upper part denticulate, almost entire, short-acuminate, with free teeth running down petiole, with scattered hairs above 0.6 mm long, hairs dense beneath and along margin, 0.6–1 mm long, with very dense hairs 1.5 mm long along midrib beneath, as a whole very densely hairy (in this respect resembling *H. sagittatum* Lindeb.), dark green, violet beneath; cauline leaves 4–8 (coefficient of leafiness 0.09), rhomboid to lanceolate, with 4–5 acute, coarse teeth to 10 mm long, bottom leaves cuneately narrowed to short petiole, upper sessile, pubescence half as dense as in basal leaves. Inflorescence openly paniculate, with 6 capitula; peduncles glabrous, to scattered-glandular, tomentose. Involucres 11–12 mm long; involucral bracts broad, abruptly triangular-acuminate, without simple hairs, moderately (60) glandular with glands 0.7 mm long, without stellate hairs. Stigmas dark. Flowering July.

European Part: Baltic Region. Endemic. Described from Valmier (Latvian SSR). Type in Riga.

Note. It is distinguished from the closely related species of *Nesaea* by its very densely hairy leaves (resembling *H. sagittatum* Lindeb.).

324. **H. mukacevense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 504.

282 Perennial. Stem to 40 cm high, 1.5 mm in diameter, sparsely hairy. Basal leaves 3, broadly lanceolate (2.5:1), abruptly narrowed to petiole, with more or less truncate base and 5–7 remote, triangular, acute teeth, acute, light glaucous, violet beneath, scattered-hairy above, moderately hairy along margin with hairs 1 mm long, with very dense hairs 1.5 mm long beneath and along midrib, as a whole densely hairy; cauline leaves 4 (coefficient of leafiness 0.10), broadly lanceolate (2.3–4:1), short-petiolate, acute, like basal leaves, stellate-hairy beneath. Inflorescence dichotomously paniculate, with 4 capitula; peduncles glabrous, with sparse glands 0.3 mm long. Involucres 9 mm long; involucre bracts narrow, linear, triangular-acuminate, without simple hairs, moderately (64) glandular, glands to 0.6 mm long, more or less without stellate hairs. Stigmas yellowish-brown. Flowering June.

Oak forests.—*European Part:* Upper Dniester. Endemic. Described from vicinity of Mukachevo (Trans-Carpathian Region). Type in Leningrad.

Note. It is distinguished from the closely related species of *Nesaea* mainly by its yellow stigmas and small involucres.

Cycle 5. Submediana Juxip.—Involucral bracts only with glands in moderate number; coefficient of leafiness 0.06–0.05, i.e., cauline leaves 2–4; stigmas yellow.

325. **H. submedianum** Zahn in Pflzr. IV, 280 (1921) 356.—*H. ochanskiense* Zahn l. c. 370.—Exs.: Zahn, Hier. Europ. No. 240 (sub *H. ochanskiense*).

Perennial. Stem 30–60 cm high, 1.5–3.0 mm in diameter, more or less glabrous or pubescent to scattered, sometimes with occasional glands above, sulcate, sometimes with lateral stems. Basal leaves 2–5, obovate, elliptical or lanceolate, gradually narrowed to mostly short petiole, obtuse to subacute, with 3–6 small, triangular or serrate teeth, grassy-green, pale beneath, glabrous above or with sparse hairs, sparsely hairy beneath, scattered along margin, dense along midrib, as a whole scattered-hairy; cauline leaves 2–3(–4) (coefficient of leafiness 0.06), lanceolate, short-petiolate or sessile, acute, slightly stellate-hairy beneath. Inflorescence dichotomously paniculate-umbellate, with 5–18

capitula; peduncles glabrous or with occasional hairs and sparse glands 0.5–0.8 mm long, tomentose. Involucres 9–10 mm long; involucral bracts lanceolate, subacute, dark, with somewhat greenish border, glabrous, moderately to densely, 60(50–90), glandular with glands 0.5–1.0 mm long, distinctly stellate-hairy along margin and at tip. Stigmas yellow, later turning brown. Flowering June to August. (Plate XXVII, Fig. 2.)

Pine forests.—*European Part*: Dvina-Pechora, Volga-Kama, Ladoga-Ilmen (northern part). Endemic. Described from Vologda Region. Type in Leningrad.

- 283 326. **H. pluricaule** Schischk. and Serg. in Sistem. Zam. po Mat. Gerb. im. Krylova pri Tomsk. Univ. 1–2 (1949) 18; Fl. Zap. Sib. XI, 3050.

Perennial. Stem 50–75 cm high, 2–4 mm in diameter, with occasional hairs 2 mm long, with occasional glands above; stems 2 to 5. Basal leaves to 9, obovate, obtuse to retuse or oblong-lanceolate, narrowed to more or less short petiole, short-acuminate, to 13 cm long (5:1), scarcely denticulate or almost entire (teeth somewhat larger towards base), with sparse hairs 1 mm long above and along margin, with scattered hairs to 1.5 mm long beneath, to dense along midrib, as a whole scattered-hairy; cauline leaves 2–4 (coefficient of leafiness 0.05), lanceolate, bottom leaf narrowed to petiole, resembling inner basal leaves, short-acuminate, densely hairy beneath along midrib, as a whole moderately (denser than basal leaves) hairy; others narrowed toward base, sessile, upper leaf linear. Inflorescence openly paniculate-corymbose with 12–22 capitula; peduncles glabrous, moderately glandular with glands 0.5 mm long, with scattered stellate hairs. Involucres 11 mm long (in original diagnosis “3–11”); involucral bracts linear, obtuse, dark, glabrous, moderately, 57(40–65), glandular with glands to 0.6 mm long, more or less without stellate hairs (in original diagnosis “covered with stellate hairs mainly in lower part...”). Stigmas yellowish-brown; achenes 3.5 mm long. Flowering July.

Pine forests, grassy patches and clearings in forest, herb slopes of steep banks in taiga.—*Western Siberia*: Ob' Region. Endemic. Described from valley of Vasyugan River (Tomsk Region). Type in Leningrad.

Note. The phrase in the original description “...stems ... covered ... with occasional and short, colorless, glandular hairs” refers partly to short broken fragments of simple hairs (*pilis abortivis*) and partly to furcate floccose (stellate) hairs.

Cycle 6. Diaphanoidea Juxip.—Involucral bracts only moderately glandular; coefficient of leafiness 0.06–0.05, i.e., cauline leaves 2–5; stigmas dark; stellate hairs on involucral bracts almost absent.

327. **H. diaphanoides** Lindeb. Hier. Bidr. (1882) 11; Stenstr. Värml. Arch. 53; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III, 164; Norrl. in Mela-Cajander, Suom. Kasvio, 708 (nota); Zahn in Pflzr. IV, 280, 350; Joh. and Sam. Dalarn. Hier. Vulgatif. 24; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 624; Samuelsson, Maps of Scand. Hier. sp. No. 85.—*H. eu-diaphanoides* Zahn in Asch. and Graebn. Synopsis, XII, II (1934) 489.—*H. murorum* γ . *medium* Lbg. in Blytt. Norg. Fl. II (1874) 652; in Hartm. Handb. Skand. Fl. ed. 11, 43.—**lc.**: Zahn in Pflzr. (l. c.) fig. 29; van Soest, in Hier. Nederl. I, fig. 19; Hegi, Ill. Fl. VI, 2, 1278, fig. 907.—**Exs.**: Lbg. Hier. Scand. cent. III, No. 123; Dahlst. Hier. exs. fasc. 1, No. 86; Herb. Hier. Scand. cent. II, No. 84, IX, No. 67, X, No. 62; Zahn, Hier. Europ. No. 239.

Perennial. Stem 30–75 cm high, 1–3 mm in diameter, with occasional hairs, occasional glands above. Basal leaves 6(3–9), in well-developed rosette, elliptical-ovate, obtuse, to oblong-lanceolate and acute, to 17 cm long (4.5:1), remotely denticulate to (in inner leaves) abundantly and unequally dentate (to dissected-dentate), sometimes with free teeth on petioles all leaves attenuate to short winged petiole, grassy-green, pale beneath, sparsely short-hairy (hairs to 1 mm long) above, beneath and along margin with scattered hairs 1.0–1.5 mm long, pubescence to dense along midrib and on petiole with soft hairs 2 mm long, as a whole to moderately pubescent; cauline leaves 3(2–5) (coefficient of leafiness 0.06), remote, sessile or short-petiolate, lanceolate or ovate-lanceolate, acute, quite strongly and at base often sharply incised. Inflorescence paniculate, often branched, umbellate above, with 8(3–16) capitula; peduncles without simple hairs, with sparse or scattered-glands 0.4–1.0 mm long, densely tomentose. Involucres (8–) 10–12 mm long, cylindrical; involucral bracts linear-lanceolate, subobtuse to acute, dark, without simple hairs, moderately, 48(30–60), glandular with glands 0.5–1.2 mm long, long and medium bracts alternately almost without stellate hairs. Stigmas rusty, later turning dark. Flowering June to July.

Edges of deciduous and coniferous forests, forested slopes.—*European Part*: Karelia-Lapland (southern part), Dvina-Pechora (western part), Ladoga-Ilmen, Baltic Region. *General distribution*: Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type in Stockholm.

328. **H. ischnoadenum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 504.

Perennial. Stem 25–65 cm high, 1.0–3.5 mm in diameter, sulcate, with scattered hairs 2–3 mm long at base, sparse glands above. Basal leaves 2–6, obovate, obtuse or to oblong-lanceolate, acute more or less abruptly or gradually narrowed to petiole, scarcely denticulate

(more distinctly at base), more or less entire in upper part, occasionally more distinctly sharply serrate, densely pubescent on both sides; cauline leaves 2(–3) (coefficient of leafiness 0.05), lanceolate, narrowed to petiole or upper leaf sessile, more or less entire or serrulate, stellate-hairy beneath along midrib. Inflorescence paniculate, with 3–10(–28) capitula; peduncles without simple hairs, moderately glandular with glands 0.5 mm long, tomentose. Involucres 8.5–10.5 mm long; involucre bracts narrow, subacute, without simple hairs, densely, 72(40–95), glandular with glands 1 mm long, almost without stellate hairs (somewhat downy at base). Stigmas dark. Flowering June to July.

285 Herb patches, dry slopes of volcanic mounds. *European Part*: Arctic Europe, Karelia-Lapland; *Western Siberia*: Ob' Region. Endemic. Described from Lake Imandra. Type in Leningrad.

Note. It is distinguished from the closely related species *H. subarcticum* Norrl. growing with it by having leaf pubescence 1.5 times denser and from *H. subpellucidum* Norrl., by pubescence 3 times denser.

Cycle 7. Ornata Juxip.—Involucral bracts only with glands in moderate number; coefficient of leafiness 0.05, i.e., cauline leaves 1–5; stigmas dark; stellate hairs on involucre bracts considerable (mainly along margin, hence involucres ornate).

329. **H. subpellucidum** Norrl. Bidr. Skand. Hier.-Fl. I (1888) 104; Norrl. in Mela-Cajander, Suom. Kasvio, 709; Zahn in Pflzr. IV, 280, 357; Dahlst in Lindem. Svensk. Fan.-Fl. 2 ed. 622; Samuelsson, Maps of Scand. Hier. sp. (1954) No. 111.—**Exs.:** Norrl. Hier. exs. fasc. VIII, Nos. 16–21; Dahlst. Hier. Scand. cent. IV, Nos. 46–49, IX, No. 68, XVII, No. 81; Lindberg, Pl. Finl. exs. Nos. 1781–1721.

Perennial. Stem 30–70 cm high, 1–4 mm in diameter, violet at base, with occasional hairs, occasional (to sparse) glands above, sometimes with lateral stems. Basal leaves 4(1–9), ovate, ovate-lanceolate to oblong-lanceolate, more or less abruptly or gradually narrowed to long petiole (5:1), obtuse to short-acuminate, to 26 cm long, with remote, sparse, fine or short teeth or with longer, acute (var. *dentatum* Brenn.) free teeth running down to petiole, olive- or light-green, glaucescent beneath, with or without sparse hairs above, along margin and beneath to scattered-pubescent, hairs 0.5–1.0 mm long, to dense pubescence beneath along midrib with hairs 1–2 mm long, as a whole to scattered-pubescent, sometimes stellate-hairy beneath; cauline leaves 2–3(1–4) (coefficient of leafiness 0.05), lanceolate, short-petiolate, in lower half finely or more or less coarsely toothed, entire toward tip, upper sessile, linear, entire, always stellate-hairy beneath, sometimes on both sides.

Inflorescence paniculate-corymbose with more or less umbellate top, with 9(3–23) capitula, branched; peduncles without simple hairs (rarely with occasional hairs), with scattered glands 0.5 mm long, scattered-tomentose. Involucres 8.5–11.0 mm long; involucral bracts somewhat narrow, linear, triangular-acuminate, blackish-green, transparent (under lens!), without simple hairs, moderately to densely, 60(40–100), glandular, with glands 0.5–1.5 mm long, narrowly stellate-hairy along margin, barbate. Stigmas dark; pappus dull white. Flowering June to August. (Plate XVI, Fig. 2.)

Riverbanks, pine-birch and pine-spruce forests, spruce and birch
286 forests, dry meadows and ridges.—*European Part*: European Arctic, Karelia-Lapland, Dvina-Pechora, Volga-Kama. *General distribution*: Scandinavia. Described from banks of Onega River. Type in Helsinki.

330. **H. subarctoum** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 709; Zahn in Pflzr. IV, 280, 357; Samuelsson, Maps of Scand. Hier. sp. No. 109.—*H. praecipuiforme* Dahlst. in Birger. Veget. o. fl. i Pajala (1904); in Lindm. Svensk. Fan.-Fl. 2, ed. 622.—*Exs.*: Norrl. Hier. exs. fasc. VIII, Nos. 6–15; Dahlst. Hier. Scand. IV, No. 52, 53 (sub *H. dourensiceps* Dahlst.), and Hier. Scand. cent. XXI, Nos. 50, 51 (sub *H. praecipuiforme* Dahlst.).

Perennial. Stem 30–65 cm high, 1.0–3.5 mm in diameter, violet at base, pubescence sparse to scattered (more conspicuously at base), with occasional glands above, sometimes with lateral stems. Basal leaves 4(1–7), mostly in well-developed rosette, obovate to elliptical, obtuse and short-acuminate or to ovate-lanceolate, more or less abruptly narrowed to short or long petiole, short-acuminate, barely toothed or serrulate, to 20 cm long (5:1), grassy-green, often violet beneath, to moderately hairy on both sides and along margin, with hairs 0.5–1.5 mm long, densely so along midrib beneath with hairs 1.5–2.5 mm long, as a whole moderately hairy; cauline leaves 2–3(1–5) (coefficient of leafiness 0.05), lanceolate, narrowed to petiole, denticulate, acuminate, sometimes stellate-hairy. Inflorescence openly paniculate-corymbose, with 3–18(–45) capitula; peduncles without simple hairs, with scattered glands 0.4–1.0 mm long, tomentose. Involucres 8–11 mm long; involucral bracts lanceolate, somewhat broad, obtuse (sometimes abruptly triangular-acuminate), rather dark, without simple hairs, densely, 95(40–105), glandular, with glands to 1.2 mm long, along margin more or less distinctly stellate-hairy. Corollas often tubular; stigmas dark; pappus snow-white. Flowering June to August.

Sandy, clayey and stony banks of lakes and rivers, meadows, edges of pine-birch and spruce-birch forests and elfin woodlands.—*European Part*: European Arctic, Karelia-Lapland, Dvina-Pechora, Volga-

Kama. *General distribution*: Scandinavia. Described from Finnish Lapland. Type in Helsinki.

Note. The ranges of *H. subarctoum* Norrl. and the closely related *H. subpellucidum* Norrl. generally coincide, although we see the first species predominating in the north and the second in the south.

331. ***H. ornatum*** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III (1894) 167; Joh. and Sam., Dalarn. Hier. Vulgatif. 54; Zahn in Pflzr. IV, 280, 356; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 622; Zahn in Asch. and Graebn. Synopsis, XII, II, 496.—**Exs.**: Dahlst. Hier. exs. fasc. II, No. 81; Hier. Scand. cent. II, Nos. 70, 69, XII, No. 86, XXI, No. 56.

287 Perennial. Stem 45–75 cm high, 1.5–3.0 mm in diameter, sparsely pubescent below, with occasional glands above. Basal leaves 4–9, in well-developed rosette, obovate, elliptical to lanceolate (4.3:1), gradually narrowed to long petiole, from more or less entire and obtuse to finely and sharply many-toothed, olive-green or glaucescent, scattered-pubescent above with hairs 1 mm long, as a whole to densely hairy, hairs 1.5–2.0 mm long; cauline leaves (1–)3(–4) (coefficient of leafiness 0.05), lanceolate, cuneate, acute, with 4–5 acute teeth, upper sessile, linear. Inflorescence paniculate, with 3–12 capitula; peduncles without simple hairs, with scattered glands and scattered stellate hairs. Involucres 10–11 mm long; involucral bracts linear, abruptly triangular-acuminate, without simple hairs, moderately (50–55) glandular with glands 0.8 mm long, densely stellate-hairy along margin but sparsely so beneath. Stigmas blackish. Flowering June to July.

Forest edges, forest shortgrass meadows.—*European Part*: Karelia-Lapland, Ladoga-Ilmen, Baltic Region. *General distribution*: Scandinavia. Described from Sweden. Type in Stockholm.

Note. It is distinguished from *H. diaphanoides* Lbg. by having dense stellate hairs on the involucral bracts, black stigmas, and densely pubescent leaves.

Cycle 8. Schelliana Juxip.—Involucral bracts only with abundant glands; glands on inflorescence sparse to scattered (total number of glands on inflorescence high); coefficient of leafiness 0.06–0.05, i.e., cauline leaves 1–5.

332. ***H. schellianum*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 505.

Perennial. Stem 40–60 cm high, 2–3 mm in diameter, violet at base, subglabrous, with occasional glands above, sometimes with lateral stems. Basal leaves 1–3, elliptical-lanceolate, gradually attenuate to long petiole, finely 4–5-toothed, teeth deltoid, remote or falcate, petiole

with free teeth, to 15 cm long (4.5:1), leaves subglabrous above, sparsely pubescent beneath and along margin, moderately so along midrib, as a whole sparsely pubescent; cauline leaves 2–4 (coefficient of leafiness 0.06), lanceolate, lower attenuate to short petiole, denticulate, upper sessile, entire. Inflorescence paniculate, with 5–8 capitula; peduncles without simple hairs, scattered-glandular with glands 0.5–1.0 mm long, scattered-tomentose. Involucres 9.5–10.5 mm long; involucral bracts somewhat broad, obtuse, dark, without simple hairs, densely, 86(80–90), glandular, glands 1.0–1.5 mm long, at base sparsely stellate-hairy, barbate. Stigmas dark. Flowering July to August.

Spruce and birch forests in mountains.—*European Part*: Volga-Kama. Endemic. Described from Urals (Bashtur Mountain). Type in Leningrad.

- 288 **Note.** It is distinguished from the closely related species *H. subarctoum* Norrl. and *H. taigense* Schischk. and Serg. as follows: from the first by generally sparse pubescence and from the second by dark stigmas.

333. ***H. taigense*** Schischk. and Serg. in Sist. Zam. po Mat. Gerb. im. Krylova pri Tomsk. Univ. 1–2 (1949) 19; Fl. Zap. Sib. XI, 3051.

Perennial. Stem 30–60 cm high, 1.2–3.0 mm in diameter, pubescence to sparse, hairs 1–5 mm long, with occasional glands above, reddish-violet at base, sulcate, sometimes with lateral stems. Basal leaves 4(1–6), obovate, ovate, attenuate to long petiole, to 22 cm long, obtuse or short-acuminate, short, more or less entire (5:1), scattered-pubescence on both sides and along margin, hairs 0.5–1.0 mm long, densely hairy along midrib beneath, hairs 1.5–2.5 mm long, as a whole pubescence moderate; cauline leaves 2(1–3) (coefficient of leafiness 0.05), lanceolate, with 1–2 fine teeth at base, short-petiolate, upper entire, acute. Inflorescence openly paniculate, with 2–10 capitula; peduncles without simple hairs, with sparse (to scattered) glands more or less tomentose. Involucres 9.5–10.5 mm long; involucral bracts narrow, linear, acute without simple hairs, with very dense, 90(65–120), glands 0.8–1.2 mm long, conspicuously stellate-hairy (at base and along margin). Stigmas yellowish-brown, later turning dark; achenes 3.2–3.5 mm long. Flowering June to August. (Plate XXVIII, Fig. 1.)

Forested slopes, cedar-fir taiga, and mixed forests.—*Western Siberia*: Ob' Region. Endemic. Described from valley of Lar-Egan River (tributary of Ob' River, Tomsk Region). Type in Tomsk; cotype in Leningrad.

334. ***H. apatitorum*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 505.

Perennial. Stem 65–75 cm high, 4–5 mm in diameter, violet at base and to sparsely hairy with white hairs 3 mm long, with occasional glands above. Basal leaves 4–6, broadly lanceolate, attenuate to petiole, with many (6–12), unequal, small and large, deltoid and lanceolate, straight and curved, acute, teeth alternating with free teeth on petioles, short-acuminate, to 20 cm long, (5:1), to scattered-hairy on both sides and along margin with hairs 0.7–1.5 mm long, along midrib beneath and as a whole to moderately pubescent; cauline leaves 4–5 (coefficient of leafiness 0.06), lanceolate to rhomboidal, attenuate to petiole, unequally and remotely toothed, short-acuminate, upper sessile, linear, entire. Inflorescence paniculate-umbellate, with 24–27 capitula; peduncles without simple hairs, with sparse glands and scattered stellate hairs. Involucres 9–10 mm long; involucral bracts narrow, subobtusate to acute, 289 dark green, without simple hairs, but with dense, 106(90–125), glands 0.2–1.0 mm long (reduced toward tip), sparsely stellate-hairy along margin. Stigmas dark. Flowering July to August.

Pine-birch forests.—*European Part*: Karelia-Lapland. Endemic. Described from vicinity of city of Apatity (Murmansk Region). Type in Kirov.

Note. In habit it resembles *H. subarctoum* Norrl., but is distinguished by its large number of glands on the narrow involucral bracts and moderate pubescence of the leaves.

335. **H. igoschinae** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 506.

Perennial. Stem 60–80 cm high, 2–4 mm in diameter, violet at base, moderately hairy in lower half with hairs 2–3 mm long, with occasional glands above. Basal leaves 2–3, lanceolate, attenuate to petiole, acute, serrulate, grassy-green, moderately hairy above and along margin with hairs 0.6–1.0 mm long, densely hairy beneath, along midrib very densely hairy, with hairs 1–2 mm long (in this respect suggesting *H. sagittatum*); cauline leaves 4–5 (coefficient of leafiness 0.06), lanceolate, tapered to short petiole, upper sessile, acute, distinctly toothed at base. Inflorescence paniculate, with 4–10 capitula; peduncles with or without occasional hairs, with scattered glands 1 mm long, tomentose. Involucres 9–10 mm long; involucral bracts narrow, obtuse to acute, without simple hairs, densely, 80(65–90), glandular, with glands 0.7–0.8 mm long, with yellow heads, almost without stellate hairs. Stigmas dark. Flowering June to July.

Beech and spruce forests, in mountains.—*European Part*: Upper Dniester. Endemic? Described from Transcarpathian Region (Svalyava District). Type in Leningrad.

Note. It is distinguished from the closely related species of cycle *Schelliana* by its very densely pubescent leaves and the involucrel bracts that are almost devoid of stellate hairs.

336. **H. bobrovii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 506.

Perennial. Stem 25–30 cm high, 2 mm in diameter, violet at base and scattered-pubescent, with occasional glands above. Basal leaves 3, ovate to lanceolate, more or less abruptly or gradually narrowed to petiole, acute, with occasional fine teeth or almost entire, to 6 cm long (4–5:1), densely hairy above and along margin with hairs 1 mm long, very densely hairy beneath and as a whole very densely so (resembling *H. sagittatum* Lindeb.), dark green; cauline leaves 1–2 (coefficient of leafiness 0.05), lanceolate, narrowed toward base, acuminate, almost entire, to densely pubescent. Inflorescence dichotomously paniculate, with 2–3 capitula; peduncles without simple hairs, with sparse glands, white-tomentose. Involucres 10 mm long; involucrel bracts narrow, subobtusate, without simple hairs, densely, 78(60–100), glandular, glands 0.6 mm long, and densely stellate-hairy, barbate. Ligule teeth orange; stigmas dark. Flowering July to August.

290 Tundra.—*European Part*: Arctic Europe. Endemic. Described from banks of Adzva River (tributary of Usa River). Type in Leningrad.

Note. Zahn (on the label) called this plant *H. caesium* Fr. ssp. *bifidiflorum* Zahn, but, since it has remained unpublished, it is a nomen nudum (*H. bifidiflorum* Deg. and Zahn is related to *H. transsilvanicum*-*H. bifidum*. Our plant is related neither to *H. caesium* nor to *H. bifidum*). It is distinguished from the closely related species by its densely stellate-hairy involucrel bracts and almost entire leaves.

Cycle 9. Debilescentia Juxip.—Involucrel bracts only with abundant glands; peduncles moderately to very densely glandular (hence, total number of glands on inflorescence unusually high); coefficient of leafiness 0.08–0.05, i.e., cauline leaves 2–4.

337. **H. debilescens** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 27; Zahn in Pflzr. IV, 280, 355.

Perennial. Stem 40–55 cm high, 2 mm in diameter, violet at base, sparsely pubescent below, with occasional glands above. Basal leaves 2, obovate to broadly lanceolate or oblong, to 14 cm long (4:1), narrowed to petiole, with 3–5 remote, fine teeth, glaucous or grassy-green, dull green beneath, sparsely hairy above with hairs 0.7 mm long, with scattered pubescence beneath with hairs 1.5–2.0 mm long, moderately hairy along margin, densely so along midrib, hairs 2.5 mm long,



as a whole moderately pubescent; cauline leaves 3–4 (coefficient of leafiness 0.08), remote, broadly lanceolate (2.5–4:1), narrowed to cuneate or round base and distinctly toothed there, upper linear-lanceolate, entire, stellate-hairy beneath. Inflorescence openly paniculate or corymbose, with 4–15 capitula; peduncles with occasional light-colored hairs 1 mm long, moderately glandular with glands 0.6 mm long, with scattered stellate hairs. Involucres 10–12 mm long; involucre bracts narrow, acute, with broad green border, without simple hairs but with dense (100) glands to 1 mm long, more or less without stellate hairs. Corollas golden yellow; stigmas dark. Flowering July to August.

Montane spruce-fir forests.—*Caucasus*: ?Southern Trans-caucasia. Described from former Artvin District. Type in Tbilisi.

338. **H. subbetuletorum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 507.

293 Perennial. Stem 35–55 cm high, 1.5–2.0 mm in diameter, violet at base, sparsely pubescent, distinctly glandular above, with large (1 mm long) glands. Basal leaves 3–8, broadly to narrowly lanceolate, gradually narrowed to petiole, serrulate, acuminate, to 17 cm long (4–6:1), moderately hairy on both sides and along margin with hairs 0.6–1.0 mm long, densely pubescent beneath along midrib with hairs 1.5 mm long, as a whole densely pubescent, stellate-hairy along midrib; cauline leaves 2 (coefficient of leafiness 0.05), bottom leaf narrowly lanceolate, petiolate, serrulate, acute, upper linear, entire, stellate-hairy beneath. Inflorescence paniculate, with 5–10 capitula, partly undeveloped; peduncles without simple hairs, with dense, large glands, scattered-tomentose. Involucres 9.5 mm long; involucre bracts, somewhat broad, subacute, without simple hairs, very densely, 105(95–115), glandular, glands to 1.2 mm long, without stellate hairs. Stigmas yellowish brown. Flowering August.

Subalpine birch forests.—*European Part*: Karelia-Lapland. Endemic. Described from Khibiny Mountains (Vudyavrchorr). Type in Kirovsk.

Note. It is distinguished from all species of this subsection by the unusually large number of glands in the inflorescence.

Subsection 5. Muroria Juxip.—Zahn in Pflzr. IV, 280 (1921) 284, 288; in Asch. and Graebn. Synopsis, XII, II, 362, 363 (ut sp. coll. *H. murorum* L.).—Characters as in key. Coefficient of leafiness 0.03(0.01–0.05(0.07)), i.e., cauline leaves 0–1 (rarely to 2, very rarely to 3 and that usually in tall plants); basal leaves at anthesis 3 to 6 (1–13), i.e., leaf rosette well developed; stem scapose; involucre bracts usually only glandular, species with occasional hairs more rare, only exceptionally with more or less considerable number of hairs *H. cuspidellum* Pohle

and Zahn, *H. hylogeton* Kozl. and Zahn, *H. kupfferi* Dahlst., *H. niveolimbatum* Juxip, *H. orbicans* Almqu.); glands 0.3–1.5 mm long, but always well developed; pollen almost always absent (see description of individual species). The range of the species of this essentially western European subsection extends eastward to the Ural Range.

In some species of this subsection we may observe a sort of “seasonal dimorphism” from year to year: besides the normal flowering at the end of June to beginning of July, this same species flowers again in October (the author collected flowering specimens of *H. distractum* Norrl. in Tallin from Kadriorg Park on November 1, 1942, and in the city of Pushkin from a park on October 9, 1951).

Note. In contrast to some species, e.g., *H. vulgatum* (Fr.) Almqu. or *H. caesium* Fr., the real species *H. murorum* L. does not exist, and whatever has been presented under this name in the floras has in fact been a very “collective” species, incorporating a whole series of morphologically as well as geographically (and ecologically) different species (“subspecies” of Zahn and other authors). We considered it necessary to combine these heterogenous elements into a subsection. Unfortunately the phylogeny of the group of species forming the subsection *Muroria* Juxip has not been adequately studied; the first
294 attempt to review it is being made for the territory of the Soviet Union.

1. Involucral bracts with glands as well as hairs.....
- + Involucral bracts only with glands (only sometimes 1–2 hairs at tips of bracts in some species).....2.
2. Number of hairs and glands on involucral bracts almost equal.....3.
- + Number of glands on involucral bracts many times more than hairs.....10.
3. Glands on involucral bracts occasional or sparse.....4.
- + Glands on involucral bracts scattered (to moderate).....8.
4. Involucral bracts with occasional (8–17) glands, without stellate hairs.....5.
- + Glands on involucral bracts sparse (20–30).....6.
5. Glands on peduncles occasional; leaves more or less glabrous; stigmas dark; plants of Baltic Region.....
-339. ***H. niveolimbatum*** Juxip
- + Glands on peduncles scattered; leaves on both sides densely pubescent; stigmas yellowish-brown; plants of Northern Urals.....
-340. ***H. cuspidellum*** Pohle and Zahn
6. Involucral bracts weakly stellate-hairy; stigmas yellowish-brown.....7.
- + Involucral bracts densely stellate-hairy; stigmas greenish; plants of Baltic Region.....343. ***H. kupfferi*** Dahlst.

7. Glands on peduncles occasional; pubescence of leaves moderate, of stem scattered; leaves coarsely toothed; plants of Caucasus.....341. **C. hylogeton** Kozl. and Zahn
- + Glands of peduncles sparse; pubescence of leaves scattered; stem more or less glabrous; plants of the North.....342. **H. cuspidelliforme** Juxip
- 8 (3). Stellate hairs on involucre bracts less conspicuous (sparse at base and along margin); leaves densely pubescent.....9.
- + Stellate hairs on involucre bracts conspicuous; peduncles with scattered glands; leaves entire, moderately, pubescent; stem sparsely pubescent; stigmas dark; plants of Urals.....346. **H. kosvinskiense** Juxip
9. Leaves in lower half toothed, with many narrow, long teeth; involucre 9–10 mm long; stigmas dark; involucre bracts subobtusate.....344. **H. persimile** Dahlst.
- + Leaves (at least at first glance) entire; involucre 9–11(–12) mm long; stigmas yellow to dark; involucre bracts acute; plants of Baltic Region.....345. **H. orbicans** Almqu.
- 10 (2). Glands on involucre bracts 2–5 times as many as hairs.....11.
- 295 + Glands on involucre bracts 10–25 times as many as hairs.....20.
11. Involucre bracts more or less without stellate hairs or with sparse to scattered hairs.....12.
- + Involucre bracts densely stellate-hairy, with moderate number of glands; stigmas yellowish-brown.....352. **H. submarginellum** Zahn
12. Glands on involucre bracts sparse or scattered.....13.
- + Glands on involucre bracts moderate or dense.....17.
13. Glands on involucre bracts and peduncles sparse; leaves moderately pubescent; stem more or less glabrous; stigmas dark; plants of the North.....347. **H. granvicum** Juxip
- + Glands on involucre bracts scattered.....14.
14. Glands on peduncles occasional (or peduncles more or less eglandular and glabrous); plants of Baltic Region.....348. **H. fennoorbicantiforme** Juxip
- + Glands on peduncles scattered.....15.
15. Leaves very densely pubescent (like *H. sagittatum*); stem more or less glabrous; plants of Baltic Region.....349. **H. glehnii** Juxip
- + Leaves with dense to scattered pubescence; plants of the North.....16.
16. Leaves densely pubescent, more or less large-toothed; involucre 10–12 mm long; stigmas yellowish-brown.....350. **H. connatum** Norrl.

- + Leaves with scattered pubescence (glabrous above), denticulate; involucre 8.5–11.0 mm long; stigmas dark.....351. **H. subcrassifolium** Zahn
- 17 (12). Involucral bracts moderately ((20–)40–75) glandular, peduncles with scattered glands.....18.
- + Involucral bracts densely (65–115) glandular; plants of the North19.
- 18. Leaves densely pubescent; stem glabrous or with occasional hairs; involucre 9–11 mm long; stigmas yellow or dark.....353. **H. proximum** Norrl.
- + Leaves moderately pubescent, stem scatteredly so; involucre 10.5–11.5(–12.5) mm long; stigmas blackish.....354. **H. fenno-orbicans** Norrl.
- 19. Involucre large (14 mm long); leaves lanceolate, acute, deeply and sharply large-toothed, pubescence scattered to sparse; plants of Kola Peninsula.....355. **H. commilitonum** Juxip
- + Involucre 10.5 mm long; leaves elliptical, broad (2.5:1), retuse, crenulate, pubescence to moderate.....356. **H. schliakovii** Juxip
- 20 (10). Involucral bracts scatteredly to moderately glandular.....21.
- 296 + Involucral bracts very densely (144) glandular with large (0.8 mm long) glands; plants of the North.....363. **H. subcompositum** Juxip
- 21. Glands on involucral bracts scattered (35–50); plants of Caucasus.....22.
- + Glands on involucral bracts moderate in number (45–70 (115))....23.
- 22. Glands on peduncles sparse; involucre 10–12 mm long; stigmas yellowish-brown; leaves denticulate.....357. **H. radiatellum** Woron. and Zahn
- + Glands on peduncles scattered; involucre 9 mm long; stigmas dark; leaves entire.....358. **H. abastumanense** Juxip
- 23. Involucral bracts distinctly stellate-hairy.....24.
- + Involucral bracts more or less without stellate hairs; peduncles moderately glandular; leaves densely pubescent, pubescence of stem to sparse; stigmas black; plants of the North.....362. **H. microplacrum** Norrl.
- 24. Glands on peduncles occasional (or absent); pubescence of leaves moderate, of stem scattered; stigmas yellow; plants of Caucasus359. **H. leucothyrsogenes** Kozl. and Zahn
- + Glands on peduncles sparse.....25.
- 25. Involucre small, 7.5–8 mm long; stigmas dark; plants of the North.....360. **H. panacoliiforme** Pohle and Zahn
- + Involucre quite large, 10–12 mm long; stigmas yellow; plants of Caucasus.....361. **H. ovalifrons** Woron. and Zahn

- 26 (1). Glands on involucre bracts sparse to scattered.....27.
 + Glands on involucre bracts moderate to very dense.....32.
 27. Glands on involucre bracts sparse; leaves densely pubescent.....28.
 + Glands on involucre bracts scattered.....29.
 28. Involucre bracts distinctly stellate-hairy; involucre 10 mm long; leaves broad (2.5:1), scarcely denticulate; plants of Caucasus.....
364. **H. kreczeticzii** Juxip
 + Involucre bracts without stellate hairs; involucre 11.0–11.5 mm long; leaves of medium width (4:1), short-toothed; plants of Baltic Region.....365. **H. uranopoleos** Juxip
 29. Involucre bracts densely stellate-hairy.....30.
 + Involucre bracts without stellate hairs.....31.
 30. Peduncles with occasional glands; involucre 10.5–12.0 mm long; stigmas greenish-brown; leaves denticulate (4.5:1), with scattered pubescence; plants of Baltic Region.....366. **H. furfuraceoides** Zahn
 + Peduncles with scattered glands; involucre 10–11 mm long; stigmas yellowish-brown; leaves broad (2.5:1), with retrorse, obspatulate teeth at base; moderately pubescent; plants of Caucasus.....367. **H. retroversilobatum** Schelk. and Zahn
 297 31. Peduncles with sparse to scattered glands; leaves moderately pubescent, denticulate; stigmas dark; plants of the North.....
368. **H. frigidellum** Pohle and Zahn
 + Peduncles densely glandular; leaves entire (almost); stigmas yellow; plants of Caucasus.....369. **H. adenoactis** Juxip
 32 (26). Involucre bracts moderately glandular.....33.
 + Involucre bracts densely or very densely glandular.....42.
 33. Involucre bracts conspicuously stellate-hairy.....34.
 + Involucre bracts (almost) without stellate hairs.....40.
 34. Leaves scarcely denticulate (at first glance appear entire).....35.
 + Leaves large-toothed.....38.
 35. Stigmas yellowish-brown.....36.
 + Stigmas dark.....37.
 36. Leaves densely pubescent; stem more or less glabrous; plants of the North.....370. **H. declivium** (Norrl.) Juxip
 + Leaves and stem with scattered pubescence; plants of Caucasus.....371. **H. cinereostriatum** Woron. and Zahn
 37. Leaves densely pubescent; stem more or less glabrous; leaves denticulate; plants of the North.....372. **H. diminuens** Norrl.
 + Leaves moderately pubescent; stem with scattered pubescence; corolla teeth ciliate.....373. **H. hjeltii** Norrl.
 38 (34). Leaves exceptionally deeply (almost lacerately) many-toothed, to densely pubescent; stem sparsely pubescent; stigmas dark; plants

- of western regions of European Part of Soviet Union.....
374. **H. carcarophyllum** K. Joh.
- + Leaves with remote, crenate or papillose and sharply serrate teeth;
 stigmas yellow; plants of Caucasus.....39.
39. Leaves moderately pubescent; stem more or less glabrous.....
375. **H. cardiophyllum** Jord.
- + Leaves scatteredly, stem moderately pubescent (hairs 2.5 mm
 long); cauline leaves with stellate hairs beneath; whole plant
 distinctly stellate-hairy.....376. **H. floccicomatum** Woron. and Zahn
- 40 (33). Peduncles with sparse glands; plants of Caucasus.....
377. **H. medianiforme** Litw. and Zahn
- + Peduncles with moderate to dense glands; stem more or less
 glabrous.....41.
41. Leaves very densely pubescent; stigmas dark; plants of the
 North.....378. **H. ovatifrons** Dahlst.
- + Leaves densely pubescent; stigmas dull green, later turning dark;
 plants of Baltic Region.....379. **H. pleuroleucum** Dahlst.
- 42 (32). Involucral bracts densely glandular.....43.
- 298 + Involucral bracts very densely glandular.....55.
43. Peduncles with occasional to scattered glands.....44.
- + Peduncles with moderate to very dense glands.....47.
44. Glands on peduncles occasional; leaves sparsely pubescent; stem
 more or less glabrous; stigmas yellow; plants of the North
380. **H. pomoricum** Juxip
- + Glands on peduncles scattered.....45.
45. Stigmas yellow; leaves densely pubescent, broad (2–3:1), crenate-
 and triangular-toothed; plants of Caucasus.....
381. **H. exotericum** Jord.
- + Stigmas dark; leaves moderately pubescent; involucre 7–10 mm
 long.....46.
46. Basal leaves abruptly narrowed to short petiole; glands 0.4–0.2
 mm long, gradually reduced toward tip and more or less botryoidly
 clustered upward; plants of Baltic Region.....
382. **H. hylocomum** Juxip
- + Basal leaves cordate or truncate, long-petiolate; glands 0.5–0.6
 mm long, more or less evenly distributed on involucral bracts
383. **H. pellucidum** Laest.
- 47 (43). Glands on peduncles moderate.....48.
- + Glands on peduncles dense or very dense.....52.
48. Leaves densely (or very densely) pubescent.....49.
- + Leaves moderately pubescent; stem with occasional hairs; involu-
 cres 9.5–11.0 mm long; plants of the North.....
387. **H. lateriflorum** Norrl.

49. Stigmas dark.....50.
 + Stigmas yellow; stem with scattered pubescence; involucre 10.0–11.5 mm long; plants of the North.....386. *H. lepidoides* K. Joh.
50. Base of lamina abruptly narrowed to petiole or more or less truncate; involucre bracts subobtusate; plants more or less of northern (northwestern) regions.....384. *H. distractum* Norrl.
 + Base of lamina conspicuously cordate or truncate, often with recurved teeth, hence leaves appearing sagittate; involucre bracts acute; plants of central, particularly southern regions.....51.
51. Involucre bracts with inconspicuous stellate hairs.....385. *H. gentile* Jord.
 + Involucre bracts with dense stellate hairs.....385. *H. gentile* var. *stellatum* Juxip
- 52 (47). Peduncles densely glandular.....53.
 + Peduncles very densely glandular, glands 0.7–1.5 mm long, fine; leaves entire, very densely short-pubescent; stigmas yellow; plants of the North.....391. *H. tenuiglandulosum* Norrl.
- 299 53. Involucre bracts quite densely stellate-hairy; stigmas yellow....388. *H. torticeps* Dahlst.
 + Involucre bracts (almost) without stellate hairs; leaves moderately or to densely pubescent.....54.
54. Involucre 11 mm long; involucre bracts acute.....389. *H. altipes* Lbg. f.
 + Involucre 10 mm long; involucre bracts somewhat obtuse; plants of the North.....390. *H. revocans* Juxip
- 55 (42). Peduncles with scattered (to moderate) glands.....56.
 + Peduncles with dense glands; leaves large-toothed; stigmas dark.....57.
56. Leaves very densely pubescent (as in *H. sagittatum*); plants of Arctic Region.....392. *H. kolicola* Juxip
 + Leaves densely pubescent; plants of southwestern region of Soviet Union.....393. *H. serratifolium* Jord.
57. Leaf base cordate, truncate, or sagittate, leaf margin toothed throughout (with large teeth toward base); plants of western and southern regions.....58.
 + Leaf base attenuate downward and then abruptly truncate; leaves densely pubescent, lyrate-toothed, with free teeth along petiole, upper part of leaf more or less entire, short-acuminate; involucre 10–11(–12) mm long; plants of northwestern region of Soviet Union.....396. *H. lyratum* Norrl.

58. Leaves very densely pubescent (as in *H. sagittatum*), very deeply and sharply many-toothed; stem sparsely pubescent below.....394. **H. grandidens** Dahlst.
 + Leaves quite densely pubescent, with more or less large teeth only at base of lamina.....395. **H. silvularum** Jord.

Cycle 1. Cuspidella Juxip.—Involucral bracts with occasional hairs and glands.

339. **H. niveolimbatus** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 507.

Perennial. Stem 60 cm high, 2.5 mm in diameter, glabrous, eglandular. Basal leaves 3–6, elliptical to oblong-ovate, with base truncate or abruptly narrowed to long petiole, to 15 cm long (5:1), remotely crenulate (teeth somewhat larger toward base), somewhat obtuse to short-acuminate, olive-green, more or less glabrous (only sparse hairs even along midrib beneath); cauline leaves 1–2 (coefficient of leafiness 0.03), bottom leaf similar to inner basal leaves, truncate, long-petiolate, toothed, short-acuminate, upper sessile, narrowly lanceolate, narrowed to sessile, cuneate base, entire. Inflorescence openly paniculate with 300 5–11 capitula; peduncles more or less glabrous and eglandular, weakly tomentose. Involucres 9.5–10.5 mm long; involucral bracts narrow, acute, sparsely pubescent, 15(10–20), with hairs 0.6 mm long and sparsely, 16(15–17), glandular with glands 0.3 mm long, without stellate hairs, but with broad whitish border. Stigmas dark; with developed pollen. Flowering June to July.

Around glint rocks (calcareous precipice of seacoast).—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Maly Pakri Island (Rogoe). Type in Riga.

Note. In habit it resembles *H. kupfferi* Dahlst. and probably is close to it, differing by the absence of stellate hairs on the involucral bracts and the very sparse pubescence of the leaves and stem. The name was given by H.G.A. Dahlstedt (on the label), who, however, did not describe the plant later. Collected by K.R. Kupffer on 30 July, 1904.

340. **H. cuspidellum** Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 113; Zahn in Pflzr. IV, 280, 332.

Perennial. Stem 25–30 cm high, 1 mm in diameter, purple-brown, with occasional hairs and at top with sparse glands, stellate-hairy. Basal leaves 4, ovate, elliptical or ovate-lanceolate, to 7 cm long (4:1), with obtuse or truncate base, short-acuminate, petiolate, remotely denticulate, on both sides densely pubescent with hairs 0.5–1.0 mm

long, along margin moderately pubescent, very densely so along midrib beneath, hairs 1.0–1.5 mm long, as a whole densely pubescent, with short woolly hairs along petiole (particularly at base), reddish or purple and somewhat stellate-hairy beneath; cauline leaves 0–1 (coefficient of leafiness 0.02), small, bracteiform. Inflorescence dichotomously paniculate, with (2–)3–5(–8) capitula; peduncles sparsely pubescent with hairs 1 mm long, with scattered glands 0.4 mm long, weakly tomentose. Involucres 7.0–8.5 mm long; involucre bracts narrow, acute, dark, very sulcate, sparsely (6–13) pubescent, with hairs 0.5–1.0 mm long and sparsely (8–10) glandular, with glands 0.4 mm long, somewhat stellate-hairy along margin close to base. Stigmas yellowish-brown. Flowering July.

Around rocks in subalpine zone.—*European Part*: Dvina-Pechora (Northern Urals). Endemic. Described from Sabel Mountain. Type in Leningrad.

Cycle 2. Cuspidelliformia Juxip.—Involucre bracts with sparse hairs and glands, only weakly stellate-hairy at base and along margin.

341. **H. hylogeton** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 10; Zahn in Pflzr. IV, 280, 320.

301 Perennial. Stem 40–75 cm high, 2–3 mm in diameter, purple at base, sulcate, more distinctly remotely pilose at base, with occasional hairs at top, more or less stellate-hairy, eglandular. Basal leaves 4, often quite large, oblong-ovate or elliptical-lanceolate, abruptly attenuate to long petiole and quite long and coarsely 3–5-toothed, at base often also deeply crenate, acuminate, dark straw-green, lustrous, paler beneath, more or less glabrous above (with occasional hairs along margin), moderately pubescent beneath and along margin with hairs 1.0–1.5 mm long, along midrib beneath and on petiole with dense, soft, woolly hairs, as a whole moderately to densely pubescent; cauline leaves 2–3 (coefficient of leafiness 0.04), like basal, lowermost winged-petiolate, often with long teeth, others sessile, acuminate, stellate-hairy along midrib beneath. Inflorescence openly paniculate, with very remote branches, with 3–12(–16) capitula; peduncles slender, with occasional hairs and occasional glands 0.3 mm long, tomentose. Involucres 9.0–10.5 mm long; involucre bracts narrow, acute, dark, sparsely (20) pubescent with hairs 1.5 mm long and also sparsely (20) glandular, glands 0.5–1.0 mm long, more or less stellate-hairy along margin. Stigmas yellowish-brown. Flowering July.

Forest and subalpine zone in mountains.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Bakuriani. Type in Tbilisi.

342. **H. cuspidelliforme** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 508.

Perennial. Stem 35–55 mm high, 2–3 mm in diameter, sulcate, glabrous, sometimes with occasional glands at top. Basal leaves 2–5, ovate, elliptical to lanceolate, to 18 cm long (4.5:1), outer with truncate and inner with abruptly narrowed base, petiolate, with 3–6 unequal, remote, serrate teeth, acute, glabrous above (or with occasional hairs toward margin), with sparse hairs 0.7–1.2 mm long beneath and along margin, hairs 1.5 mm long and to dense along midrib, as a whole pubescence to scattered; cauline leaves 0–1 (coefficient of leafiness 0.02), lanceolate-linear (18:1), acuminate, sessile. Inflorescence corymbose, with 3–20 capitula; peduncles with occasional hairs 1 mm long and sparse glands 0.5 mm long, tomentose. Involucres 8–10.5 mm long; involucre bracts sparsely, 16(10–26), pubescent with hairs 1 mm long, sparsely, 24(15–32), glandular, glands 0.5 mm long, at base somewhat stellate-hairy. Stigmas yellowish-brown or dull green. Achene 3.5 mm long. Flowering July to August.

Subalpine birch forests with *Cornus suecica* L. and pine forests.—*Arctic*: Arctic Europe; *European Part*: Karelia-Lapland. Endemic. Described from banks of Kola River. Type in Kirovsk.

Note. It is distinguished from the closely related *H. cuspidellum* Pohle and Zahn by its larger involucres and to scattered-pubescent leaves.

Cycle 3. Kupfferia Juxip.—Involucre bracts with sparse simple hairs, dense stellate hairs.

302 343. **H. kupfferi** Dahlst. Beitr. Hier.-Fl. Oesels (1901) 33; Zahn in Pflzr. IV, 280, 319; in Asch. and Graebn. Synopsis, XII, II, 474.—**Ic.**: Dahlst. (op. c.) t. III, fig. 1 (folia).

Perennial. Stem 40–70 cm high, 1.0–2.5 mm in diameter, more or less glabrous (occasional hairs and at top with glands). Basal leaves 4–7, elliptical to lanceolate, with truncate base, long, winged-petiolate, to 18 cm long (5:1), short-acuminate, densely and unevenly serrate (larger teeth at base) and with free teeth along petiole, olive-green, purple beneath, more or less glabrous above, sparsely pubescent beneath with hairs 0.7 mm long, scattered-hairy along margin, densely so along midrib, with hairs 1.5–2.0 mm long, as a whole pubescence scattered; cauline leaves 0–1 (coefficient of leafiness 0.01), short-petiolate, in middle of stem, like basal leaves in shape and pubescence, distinctly stellate-hairy beneath. Inflorescence paniculate-corymbose, with 5–11 capitula; peduncles with occasional hairs, sparsely glandular, tomentose. Involucres 9.5–11.5 mm long, cylindrical; involucre bracts

linear-lanceolate, acute, sparsely, 17(10–27), pubescent with hairs 0.7 mm long, sparsely, 20(12–30), glandular, glands 0.3 mm long, densely stellate-hairy throughout. Stigmas dull green, later turning brown. Flowering June to July.

Open deciduous forests.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Saaremaa (Oesel) Island. Type in Riga.

Cycle 4. *Orbicantia* Juxip.—Glands and simple hairs on involucre bracts scattered to moderate (more or less equal in abundance), stellate hairs very sparse.

344. **H. persimile** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II (1893) 155; Zahn in Pflzr. IV, 280, 335; Joh. and Sam. Dalarn. Hier. Silvaticif. 63; Dahlst. in Lindm. Svensk. Fan.-Fl. 2, ed. 616; Asch. and Graebn. Synopsis, XII, II, 472.—**Exs.**: Dahlst. Hier. exs. II, Nos. 43, 44; Herb. Hier. Scand. cent. III, No. 63, XI, No. 17, XIV, No. 17.

Perennial. Stem 40–75 cm high, 2.5–4.5 mm in diameter, reddish-purple at base, with occasional hairs, with occasional glands at top. Basal leaves 3–8, outer ovate to ovate, obtuse, with truncate base, inner large (to 25 cm long), obvate-oblong or oblong-lanceolate (4:1), with base truncate or somewhat decurrent to long, winged petiole, with many teeth in lower half, teeth papilliform to (at base and along petiole) lanceolate or lobate, coarse, narrow and long; leaves somewhat obtuse or short-acuminate, dark, straw-green, paler beneath, often reddish, on both sides with sparse (to scattered) hairs 0.5–1.0 mm long, hairs along margin moderate, 1.5–2.0 mm long, very dense along midrib
303 beneath, as a whole densely pubescent; cauline leaves 1(–3) (coefficient of leafiness 0.03), narrowly linear-lanceolate, short-winged-petiolate or sessile, abruptly lacerately toothed at base, long-acuminate. Inflorescence paniculate, with upwardly turned branches and 5–12 capitula; peduncles glabrous or with occasional hairs and sparse glands 0.5 mm long; tomentose. Involucres 9–10 mm long, ovate, later truncate; involucre bracts somewhat broad, subobtuse to acute, with tufted dark (with light cusps) hairs sparse to scattered, 20(10–40), 1 mm long, and with scattered to moderate, 40(30–60), glands 0.6–1.0 mm long, along margin slightly (less conspicuous) stellate-hairy. Stigmas dark. Flowering June to July.

Forested slopes.—*European Part*: Upper Dnieper. *General distribution*: Scandinavia, Central Europe. Described from Sweden. Type in Stockholm.

345. **H. orbicans** Almqu. ex Stenstr. Värml. Archier. (1889) 23; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II, 162; Norrl. in Mela-Cajander,

Suom. Kasvio, 692 (nota); Zahn in Pflzr. IV, 280, 341; Joh. and Sam. Dalarn. Hier. Silvaticif. 56; Dahlst. in Lindm. Svensk. Fan.-Fl. 2, ed. 616; Asch. and Graebn. Synopsis, XII, II, 477; Samuelsson, Maps of Scand. Hier. sp. No. 55.—*H. murorum rotundatum* Fr. Symb. (1848) 109.—**Exs.:** Dahlst. Hier. exs. III, No. 38; Herb. Hier. Scand. cent. I, No. 69; Norrl. Hier. exs. fasc. IX, Nos. 56–58.

Perennial. Stem 35–75 cm high, 1.5–4.0 mm in diameter, with occasional (very rarely to scattered) hairs, eglandular or with occasional glands at top. Basal leaves 4–13, in well-developed rosette, outer small, suborbicular or even reniform (often withering by anthesis), inner larger (to 26 cm long), ovate to lanceolate, with cordate or truncate base, long-petiolate, short-acuminate, with more or less distinct teeth only at base of lamina, with remote, fine teeth above (at first glance appearing entire), less often with 5–7 distinct teeth, dark, olive-green, paler beneath, often purple, pubescence very variable; glabrous above or with occasional (to moderate) hairs 0.3–0.4 mm long, moderately pubescent beneath and along margin, with hairs 0.6–0.8 mm long, very dense hairs along midrib and petiole, hairs 1.5–2.0 mm long, as a whole pubescence to dense; cauline leaves 1(–2) (coefficient of leafiness 0.03), in shape and pubescence like outer basal leaves, petiolate or upper leaf sessile, smaller. Inflorescence paniculate-corymbose, with 5–23 capitula; peduncles glabrous or with occasional to sparse hairs, on average sparsely glandular (actually glandularity varies from occasional to moderate), tomentose. Involucres 9–11(–12) mm long, cylindrical; involucre bracts quite broad, subacute, sparsely to moderately, 304 28(15–60), pubescent hairs 1 mm long, light-colored with dark base and sparsely to densely, 40(25–65(80)), glandular, glands 0.3–1.0 mm long, at base and along margin sparsely stellate-hairy, barbate. Stigmas yellow to dark; with or without pollen. Flowering June to July.

Overgrown mixed-forest slopes of moraines, on humus-rich soil, often together with *H. hjeltii* Norrl., preferring shady places, whereas the latter grows in open places.—*European Part:* Baltic Region. *General distribution:* Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type in Stockholm.

Note: This species is very interesting with respect to its range: besides the center of distribution, occupying the southern half of the Scandinavian Peninsula (to 63° N. lat., it is found on the Åland Islands, in the Baltic Region. (Estonian SSR and Latvian SSR), Denmark, Scotland and Hungary. This species is extremely polymorphic with exceptionally variable pubescence (and glandularity) on all parts, yellow and dark stigmas, and the presence or absence of developed pollen. One should consider this to be a collective species, which in the future will be split into a number of small local species.

In contrast to most of the species of subsection *Muroria*, found singly or in small populations, *H. orbicans* often forms communities.

Cycle 5. *Kosvinskia* Juxip.—Glands and simple hairs on involucre bracts scattered to moderate, stellate hairs dense.

346. ***H. kosvinskiense*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 508.

Perennial. Stem 40 cm high, 2 mm in diameter, pubescence to sparse, with occasional glands at top. Basal leaves 5, elliptical, obtuse to lanceolate, with base truncate or rather short-attenuate to petiole, acuminate, somewhat recurved, entire (only outer leaves with 2–3 fine teeth), broad (3.5:1), dark green, with scattered hairs 0.5 mm long above, moderately hairy beneath, along margin, and along midrib with hairs 1 mm long, as a whole pubescence moderate; cauline leaves 1 (coefficient of leafiness 0.03), linear-lanceolate to linear. Inflorescence corymbose-umbellate, with long branches and 8 capitula, partly undeveloped; peduncles with occasional to sparse hairs 1 mm long and with scattered glands 0.5 mm long, weakly tomentose. Involucres 9 mm long; involucre bracts narrow, acute, with sparse (20) hairs 1 mm long and scattered (34) glands 0.5 mm long, along margin and at base distinctly stellate-hairy, barbate. Stigmas dark. Flowering July.

Mountain Slopes.—*European Part*: Volga-Kama (Urals). Endemic. Described from Kosvinsky Kamen. Type in Leningrad.

Note. It is distinguished from the closely related *H. persimile* Dahalst. by its inner basal leaves, which are lanceolate and entire, and by its distinctly stellate-hairy involucre bracts.

305 **Cycle 6. *Granvica* Juxip.**—Hairs on involucre bracts occasional, glands sparse.

347. ***H. granvicum*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 5–9.

Perennial. Stem 40–45 cm high, 3 mm in diameter, more or less glabrous, with occasional glands at top. Basal leaves 4, lanceolate, narrow, outer with truncate base, inner with abruptly attenuate base, with 4–5 distinct teeth, with free teeth along petiole, to 20 cm long (8:1), on both sides and along margin with sparse hairs 0.5–1.0 mm long, moderately pubescent along midrib beneath with hairs 1.5 mm long, as a whole pubescence scattered; cauline leaves 1 (coefficient of leafiness 0.02), lanceolate to linear, more or less glabrous. Inflorescence corymbose, with 6–11 capitula; peduncles without simple hairs, sparsely glandular, scattered-tomentose. Involucres 9.5 mm long;

involucral bracts narrow, acute, with occasional (10) hairs 0.6 mm long and with sparse (20) glands 0.4 mm long, with scattered stellate hairs along margin. Stigmas dark. Flowering June.

Railroad embankments.—*European Part*: Karelia-Lapland. Endemic. Described from vicinity of White Sea settlement (Kirov railroad) near Kandalaksha. Type in Kirovsk.

Note.: It is distinguished from *H. connatum* Norrl. by the sparse glands on its inflorescence, scattered pubescent leaves, shorter involucre, and dark stigmas.

Cycle 7. Connata Juxip.—Hairs on involucral bracts occasional to sparse, glands scattered.

348. **H. fennoorbicantiforme** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 509.

Perennial. Stem 45–70 cm high, 2.5–3.0 mm in diameter, branched, strong, more or less glabrous, eglandular, Basal leaves 6–7, large (to 22 cm long), elliptical, oval, oblong-lanceolate, with truncate base, abruptly narrowed to rather long petiole, subobtuse to acute (4.5:1), with broad, acute, large teeth at base (with free teeth running down petiole), dark green, lead-gray beneath, often violet, glabrous above, with occasional hairs 1 mm long beneath, pubescence scattered along margin, with dense hairs 2 mm long along midrib beneath, as a whole pubescence scattered; cauline leaves 1–2 (coefficient of leafiness 0.03), lanceolate, bottom leaf short-petiolate, long-acuminate, deeply and coarsely sharp-toothed at base, upper leaf sessile, entire, acute. Inflorescence paniculate-corymbose, with 11–18 capitula; peduncles more or less without simple hairs and glands, tomentose. Involucre 9.5–10.5 mm long, cylindrical; involucral bracts acute, with occasional (to 306 10) hairs 1 mm long, with scattered, 36(30–45), glands 0.5 mm long, more or less without stellate hairs. Stigmas brown; with developed pollen. Flowering July.

Wooded slopes of moraines.—*European Part*: Baltic Region. Endemic. Described from Estonian SSR (Aegvidu). Type in Tartu.

Note. In habit and other characters it is close to *H. fenno-orbicans* Norrl. and perhaps represents a local race of this species toward the south of the main range.

349. **H. glehnii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 510.

Perennial. Stem up to 55 cm high, 3 mm in diameter, glabrous or with occasional hairs, with occasional glands at top. Basal leaves 6, ovate to broadly lanceolate, to 14 cm long (4:1), with cordate or

truncate base, short-petiolate, short-acuminate, unevenly serrulate, with free teeth on petiole, dark green, purple beneath, densely pubescent above and along margin with hairs 0.5 mm long, very densely pubescent beneath and along midrib with hairs 0.7–1.5 mm long, as a whole pubescence very dense (in this regard resembling *H. sagittatum* Lbg.); cauline leaves 1 (coefficient of leafiness 0.02), lanceolate, narrowed toward base, more or less glabrous but densely stellate-hairy beneath. Inflorescence paniculate-umbellate, with 10 capitula; peduncles with occasional hairs, scatteredly or moderately glandular, tomentose. Involucres 11 mm long; involucre bracts narrow, obtuse, with occasional (11) dark hairs 0.7 mm long, with scattered (35) glands 0.5 mm long, scarcely stellate-hairy. Stigmas dark. Flowering July.

Open deciduous forests.—*European Part*: Baltic Region. Endemic. Described from Saaremaa Island (Oesel). Type in Tallin.

Note. The type specimen was identified by H.G.A. Dahlstedt as *H. aquiliceps* Dahlst.; however, it does not agree with the diagnosis of this species in the dense pubescence of the leaves. This species is extremely close to *H. proximum* Norrl., which is distinguished from it by having dark stigmas, obtuse involucre bracts, and dense pubescence on the leaves.

350. *H. connatum* Norrl. in Mela-Cajander, Suom. Kasvio (1906) 695; Zahn in Pflzr. IV, 280, 344 (nota). Exs.: Norrl. Hier. exs. fasc. V, No. 95.

Perennial. Stem 30–50 cm high, 2–3 mm in diameter, reddish-violet at base, sulcate, with occasional hairs and with occasional glands at top. Basal leaves 2–6, ovate, obtuse to lanceolate and acute, to 15 cm long, rather long-petiolate, with truncate base (4.5:1), with unequal, small and more or less large, alternating teeth (5–10 broad or narrow, acute, serrate teeth), dark- or olive-green, on both sides and along margin to moderately pubescent with hairs 0.6–1.0 mm long, to densely
307 pubescent along midrib with hairs 1.5–2.0 mm long, as a whole pubescence dense, (petioles with scattered pubescence, hairs 4 mm long), sometimes leaves more or less stellate-hairy beneath; cauline leaves 0–1 (coefficient of leafiness 0.02), lanceolate, usually small, sessile, stellate-hairy beneath. Inflorescence corymbose, with 3–7 capitula; peduncles with occasional to sparse hairs and scattered to moderate glands 0.4–0.5 mm long, more or less tomentose. Involucres 10–12 mm long; involucre bracts narrow, acute, or outer bracts subobtuse, to sparse, 19(17–25), dark hairs 1 mm long and scattered, 46(33–62), glands 0.6 mm long, along margin somewhat stellate-hairy. Stigmas yellowish-brown, but dark when dry. Flowering June to August.

Sandy fields, short-grass tundra meadows on moraines, spruce-pine forests.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia (Finland). Endemic. Described from Kuopio. Type in Helsinki.

351. **H. subcrassifolium** Zahn in Pflzr. IV, 280 (1921) 332 (nota).—*H. crassifolium* Dahlst. ex Noto, Tromsö amts Hier.-fl. I (1910) 46; non Bernh., nec Schult.

Perennial. Stem 30–60 cm high, 1.5–2.5 mm in diameter, sulcate, violet at base, more or less glabrous, with occasional glands at top. Basal leaves 2–6, ovate to lanceolate, to 20 cm long (5:1), with base truncate or abruptly narrowed to short petiole, mostly acute, finely serrulate (5–10 teeth, at base usually larger), dark green, often violet beneath, usually glabrous above, to scattered pubescent beneath and along margin, hairs 0.5–1.0 mm long, along midrib beneath hairs to dense, 1.0–1.5 mm long, as a whole pubescence scattered; cauline leaves 0–1(–2) (coefficient of leafiness 0.02), lanceolate, bottom leaf mostly abruptly narrowed to conspicuous petiole, serrate, acute, or small, sessile (in lower third of stem). Inflorescence openly paniculate-corymbose, with 2–12 capitula; peduncles with occasional hairs (or without hairs), scattered-glandular, glands 0.5 mm long, tomentose. Involucres 8.5–11 mm long; involucral bracts quite narrow, acute, with occasional, 7(3–13), hairs 1 mm long, with scattered, 35(20–60), glands 0.6 mm long, along margin somewhat stellate-hairy, dorsally glabrous. Stigmas dark. Flowering June to August.

Stony alluvial deposits, birch forest, wet tundra, subalpine zone.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Endemic. Described from Tromsö. Type in Stockholm?

Cycle 8. Submarginella Juxip.—Involucral bracts with occasional hairs and moderate number of glands, very densely stellate-hairy.

352. **H. submarginellum** Zahn in Schedae HFR (1905) fasc. XXVI, No. 1294; Fedde, Repert, III. 389.

308 Perennial. Stem 25–70 cm high, 2.0–3.5 mm in diameter, violet at base, almost without simple hairs and glands, stellate-hairy at top. Basal leaves 4–6, ovate, elliptical to ovate-lanceolate, to 21 cm long, with cordate or truncate base, long-petiolate, broad (3.5:1), obtuse or short-acuminate, with 2–5 quite small, spinose teeth, at first glance appearing almost entire, somewhat more distinctly toothed only at base of lamina, dark green, grayish-glaucous beneath, pubescence to sparse above, hairs 0.4 mm long, to moderately hairy beneath and along margin, hairs 0.6–1.0 mm long, densely so along midrib beneath,

as a whole pubescence moderate; cauline leaves (0)1–2 (coefficient of leafiness 0.03), elliptical to lanceolate, short-petiolate to sessile, bottom leaf at truncate base with somewhat conspicuous teeth, above with sharp fine teeth, sagittate, upper leaf entire, stellate-hairy beneath. Inflorescence paniculate-corymbose with 5–6 capitula; peduncles without simple hairs, with occasional glands 0.3 mm long, tomentose. Involucres 9.5–10.0 mm long (in original diagnosis 8–9 mm long!), ovate; involucre bracts narrow, obtuse, dark, with light border, with occasional, 7(3–10), hairs 1 mm long, moderately, 48(35–55), glandular, glands 0.4–1.0 mm long, very densely stellate-hairy, particularly along margin. Stigmas yellowish-brown. Flowering June to July. (Plate XXIII, Fig. 2.)

Spruce forest on slopes, on calcareous rocks.—*European Part*: Ladoga-Ilmen. Endemic. Described from vicinity of Pskov. Type in Leningrad.

Cycle 9. Proxima Juxip.—Involucral bracts with occasional to sparse hairs and moderate to dense glands, without stellate hairs or slightly pubescent (number of glands 2–5 times greater than number of hairs).

353. **H. proximum** Norrl. Herb. Mus. Fenn. ed. 2 (1889) 151; in Mela-Cajander, Suom. Kasvio, 695; Brenn. Finl. Hier.-form. I, 125; Zahn in Pflzr. IV, 280, 336; Asch. and Graebn. Synopsis, XII, II, 472, nec Hanb.—*H. silvaticum* ssp. 11 *pellucidum* var. 3 Almq. Stud. (1881) p. XX.—*H. praetenerum* Almq. ex Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II (1893) 158; Linton, British. Hier. 55; Dahlst. Beitr. Hier.-Fl. Oesels, 29; Joh. and Sam. Dalarn. Hier. Silvaticif. 70; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed., 616; Samuelsson, Maps of Scand. Hier. sp. No. 62.—*H. ciliatum* Almq. *β. praetenerum* Williams, Prodr. III (1902) 141.—**Exs.**: Nord. Hier. exs. fasc. V, Nos. 92, 93; VII, Nos. 79, 80; IX, No. 72; Dahlst. Hier. Scand. cent. XVII, No. 64 (sub *H. proximo*); Dahlst. Hier. exs. II, Nos. 39, 40, IV, No. 62; Hier. Scand. cent. I, Nos. 74–76, IV, No. 22 (sub *H. praetenero*).

309 Perennial. Stem 25–60 cm high, 1–3 mm in diameter, dark violet at base, glabrous or sometimes with occasional (to sparse) simple hairs, with occasional glands and stellate hairs at top. Basal leaves 2–8, from cordate-obtuse and obovate to ovate, oblong-ovate, or lanceolate-ligulate, to 18 cm long, with truncate base or more or less abruptly narrowed to petiole, obtuse to acute (4:1), with 3–7 remote, fine, triangular or serrate teeth, light straw-green or slightly glaucous, pale blue beneath, often violet, on both sides and along margin moderately (to densely) pubescent with short hairs 0.2–1.0 mm long, hairs dense

along midrib beneath, hairs 1–2 mm long, as a whole pubescence moderate to dense, with stellate hairs along midrib beneath (actually, pubescence of leaves highly variable!); cauline leaves 0–1(–2) (coefficient of leafiness 0.02), mostly in middle of stem, small, narrowly lanceolate, sessile, often bracteiform; stellate-hairy beneath. Inflorescence corymbose with 2–16 capitula; peduncles without or with occasional simple hairs 1 mm long, with scattered glands 0.3–0.6 mm long, tomentose. Involucres 9–11 mm long, ovate, involucral bracts linear, narrow, acute, with occasional to sparse, 6(2–23), dark hairs 0.6–1.2 mm long and scattered to moderate, 40(20–70), well-developed glands 0.3–1.0 mm long, along margin with scattered stellate hairs. Stigmas yellow or dark. Flowering June to August.

Forested slopes, spruce and thin birch woodlands, subalpine birch, and pine-birch forests, along edges of forests preferring calcareous soil.—*European Part*: Karelia-Lapland, Dvina-Pechora, Ladoga-Ilmen (northern part), Baltic Region (Estonian SSR, western part). *General distribution*: Scandinavia, Atlantic Europe (England and Scotland), Central Europe (Hungary?, Austria?). Described from Finland. Type in Helsinki.

Note. A highly polymorphic species in the form of the leaves and their pubescence, which varies to quite a wide extent.

In the Estonian material, Dahlstedt established (on labels!) the form—*f. persimiliforme* Dahlst., which is distinguished only by the taller habit, larger, soft leaves, and sparser leaf pubescence. Apparently, it should be understood simply as a shade form not deserving separate status.

354. **H. fenno-orbicans** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 692; Zahn in Pflzr. IV, 280, 342; Samuelsson, Maps of Scand. Hier. sp. No. 35.—**Exs.**: Norrl. Hier. exs. fasc. V, Nos. 71–73.

Perennial. Stem 40–60 cm high, 2–3 mm in diameter, sulcate, violet at base, scattered-pubescent below with hairs 2 mm long, with occasional glands above, and scattered stellate hairs. Basal leaves 3–8, orbicular, elliptical, ovate, to broadly lanceolate (sometimes large, to 20 cm long), broad (2–3.5:1), with obtuse, truncate base or abruptly narrowed to short or quite long petiole, remotely denticulate or alternately coarsely and finely toothed (at base teeth usually large), olive-green, 310 glaucous, paler, or reddish beneath, glabrous above or with occasional hairs along margin (outer leaves with more hairs), sparse hairs 0.6 mm long, moderately pilose along margin, hairs 0.5–0.6 mm long, densely so along midrib beneath, hairs 1.5–2.5 mm long, as a whole pubescence moderate, but petiole lanate; cauline leaves 1(–2) (coefficient of leafiness 0.03), lanceolate, petiolate, conspicuously unequally and abundantly

toothed with free teeth at base, acute, stellate-hairy along midrib beneath. Inflorescence corymbose, with upward-turned branches and 3–7 capitula; peduncles with occasional hairs 1 mm long and with scattered glands 0.5 mm long, scatteredly stellate-hairy. Involucres 10.5–11.5(–12.5) mm long, cylindrical; involucre bracts somewhat broad, acute, with sparse, 18(10–27), light-colored hairs 0.7–1.2 mm long having dark base, moderately, 60(40–75), glandular, glands 0.3–0.5 mm long, along margin with scattered stellate hairs, barbate. Stigmas blackish. Habit resembling *H. distractum* Norrl. Flowering July to August.

Wooded hills, edges of pine forests.—*European Part*: Karelia-Lapland (southern part), Ladoga-Ilmen (northern part). *General distribution*: Scandinavia (Finland). Endemic. Described from Finland. Type in Helsinki.

355. *H. commilitonum* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 510.

Perennial. Stem 43–50 cm high, 2–3 mm in diameter, with lateral stems, glabrous, with occasional glands at top. Basal leaves 9–10, ovate, elliptical to oblong-lanceolate, to 20 cm long (4:1), obtuse or acute, base truncate, abruptly or more or less gradually narrowed to petiole, very unevenly toothed with many (to 10) variously sharp-pointed teeth, inner leaves at base with deep, lobed, large teeth decurrent on petiole, yellowish-green, cinereous beneath, pubescence quite variable: from scattered to almost absent; cauline leaves 1–2 (coefficient of leafiness 0.03), narrow, linear-lanceolate, entire. Inflorescence dichotomously paniculate, quite open, with 3 capitula, on long peduncles; peduncles with occasional hairs, scattered-glandular, glands 0.5 mm long, weakly tomentose. Involucres large, 14 mm long; involucre bracts narrow, acute, with sparse, 18(14–24), dark hairs 1 mm long and with dense, 90(65–115), glands 0.4–1 mm long, without stellate hairs. Stigmas dark. Flowering July to August.

Birch forest with *Cornus suecica* L.—*European Part*: Karelia-Lapland. Endemic. Described from Khibiny, Vud'yavrchorr. Type in Kirovsk.

Note. It is distinguished from *H. crassifolium* Dahlst., with a very similar habit, by its considerably larger number of glands in the inflorescence and large (14 mm long) involucres.

313 356. *H. schliakovii* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 511.

Perennial. Stem 40–45 cm high, 3 mm in diameter, violet at base, to sparsely pubescent, sparsely glandular above. Basal leaves 4, outer



small, rounded, elliptical, or cordate, inner obovate to elliptical, larger, broad (2.5:1), all leaves retuse, with 2–5 small, crenate, unequal, spinescent teeth, with base cordate or truncate and abruptly narrowed to petiole, straw-green, on both sides and along margin pubescence to scattered, hairs 0.5–0.7 mm long, to dense along midrib beneath, hairs 1 mm long, as a whole pubescence moderate, with occasional small glands along margin; cauline leaves 1–2 (coefficient of leafiness 0.03), lanceolate, bottom leaf petiolate, denticulate, somewhat obtuse, upper sessile, entire, acute. Inflorescence paniculate-corymbose with 5–7 capitula, peduncles with occasional, hairs 0.7 mm long, and moderate number of glands 0.3 mm long, with scattered stellate hairs. Involucres 10.5 mm long, turbinate; involucre bracts somewhat broad, triangular, acuminate, dark green, with sparse, 20(16–22), hairs 1 mm long, with dense, 80(68–88), glands 0.3–0.4 mm long, more or less without stellate hairs. Stigmas dark. Flowering August.

Birch forest.—*European Part*: Karelia-Lapland. Endemic. Described from Khibiny [Mountains] (Vudyavrchorr). Type in Kirovsk.

Note. A species intermediate between *H. crassifolium* Dahlst. and *H. proximum* Norrl. It is distinguished from both species by its very densely glandular inflorescence and unusually broad leaves with retuse teeth.

Cycle 10. Radiatella Juxip.—Involucral bracts with occasional hairs and scattered glands; glands 20–25 times as many as hairs; plants of Caucasus.

357. *H. radiatellum* Woron. and Zahn in Vestn. Tifl. Bot. Sada, 12 (1908) 17; Zahn in Pflzr. IV, 280, 331.

Perennial. Stem 25–30 cm high, 1–2 mm in diameter, sulcate, violet at base with sparse hairs 1.5–2.5 mm long, with occasional glands above and somewhat stellate-hairy throughout. Basal leaves more or less withered, 1–3, outer round, small, short-petiolate, denticulate with spinescent teeth, obtuse, inner quite large, ovate-lanceolate, with truncate base or abruptly narrowed to short petiole, acuminate, with 2–5 small, remote teeth (teeth at base somewhat larger), dark green, paler beneath with dark veins, glabrous above (outer leaves with sparse hairs along margin), sparsely pubescent beneath, with scattered to moderate hairs, along margin 1 mm long, to (quite) densely pubescent along midrib beneath (as on petioles), as a whole pubescence dense; cauline leaves 1–2 (coefficient of leafiness 0.05), ovate-lanceolate, bottom leaf with short, winged petiole, acute, truncate at
314 base or with 1–2 distinct teeth, sagittate, pubescence to moderate, stellate-hairy beneath, upper leaf small, sessile, linear-lanceolate,

entire. Inflorescence openly paniculate-umbellate, with 4–10 capitula; peduncles glabrous (or with occasional hairs), sparsely glandular, glands 0.3 mm long, tomentose. Involucres 10–12 mm long; involucral bracts narrow, long-acuminate, dark green, with occasional, 3(0–8), hairs 1 mm long, with scattered, 42(35–50), glands 0.7 mm long, with narrow stellate-hairy border. Stigmas yellowish-brown. Flowering June to July.

Mountain slopes.—*Caucasus*: ?Southern Transcaucasia. Endemic. Described from former Artvin District. Type in Tbilisi.

Note. The species is quite close to *H. ovalifrons* Woron. and Zahn.

358. *H. abastumanense* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 511.

Perennial. Stem 45 cm high, 2.5 mm in diameter, reddish-violet at base, to sparsely pubescent, with occasional glands at top. Basal leaves to 7, oval to lanceolate, quite abruptly narrowed to petiole, to 13 cm long (4.5:1), entire, moderately pubescent above, with hairs 1 mm long, with pubescence scattered along margin, dense beneath and very dense along midrib, as a whole pubescence dense; cauline leaves 1 (coefficient of leafiness 0.02), lanceolate, short-petiolate, acute, less (moderately) pubescent. Inflorescence paniculate, with 7 capitula; peduncles with occasional hairs 1 mm long and scattered glands 0.3 mm long. Involucres 9 mm long; involucral bracts narrow, acute, glabrous or with occasional hairs, moderately (48) fine glandular, glands 0.5 mm long, more or less without stellate hairs. Stigmas dark. Achenes 3.5 mm long. Flowering June.

Mountains, 1500–1800 m.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Abas-Tuman. Type in Leningrad.

Note. The unique shape of its leaves resembles the leaves of *Succisa pratensis* Moench. It is distinguished from the closely related *H. radiatellum* Woron. and Zahn by having shorter involucres and dark stigmas.

Cycle 11. Panaeoliformia Juxip.—Involucral bracts with occasional to sparse hairs, moderate glands, distinctly stellate-hairy.

359. *H. leucothyrsogenes* Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 9; Zahn in Pflzr. IV, 280, 331.

Perennial. Stem 50–65 cm high, with scattered soft hairs 2–3 mm long, densely stellate-hairy above. Basal leaves large, ovate and obtuse to broadly ovate, oblong, with base truncate or obtuse or abruptly narrowed to short petiole, short-acuminate, denticulate or short-toothed

- 315 to base, light green, whitish-green beneath, glabrous above or with occasional hairs, pubescence scattered beneath, to dense along margin, along midrib beneath, and on petioles with hairs 2–3 mm long, as a whole moderately hairy; cauline leaves 2 (coefficient of leafiness 0.04), bottom leaf broadly ovate-oblong, quite large, abruptly narrowed at base to short, winged petiole, with 2–3 large teeth, acuminate, upper leaf small, lanceolate, stellate-hairy beneath. Inflorescence panicle, with long branches and 3–15 capitula; peduncles glabrous or with occasional hairs, moderately fine-glandular, weakly tomentose. Involucres 9–10 mm long, involucral bracts lanceolate, subobtusate to acute, barbate, glabrous or with occasional hairs, moderately fine-glandular and densely stellate-hairy. Stigmas yellow. In habit it is close to *H. cinereostriatum* Woron. and Zahn. Flowering July.

Caucasus: Eastern Transcaucasia. Endemic. Described from vicinity of Bakuriani (Kokhta Mountains). Type unknown.

360. *H. panaeoliforme* Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 113; Zahn in Pflzr. IV, 280, 339.

Perennial. Stem 25–30 cm high, 1–2 mm in diameter, with occasional hairs. Basal leaves small, elliptical to ovate-lanceolate, obtuse to acute, with base truncate or abruptly narrowed to petiole, with many teeth, large at base, small toward tip, glaucescent, violet beneath, glabrous above, sparsely pubescent beneath, moderately so along margin and midrib beneath, petiole lanate; cauline leaves 0–1 (coefficient of leafiness 0.02), narrowly lanceolate, stellate-hairy beneath. Inflorescence corymbose, with 3–6 capitula; peduncles sparsely pubescent and sparsely glandular, tomentose. Involucres small, 7.5–8.0 mm long, ovate; involucral bracts somewhat narrow, acuminate, sparsely pubescent, hairs 0.5 mm long, moderately short-glandular, with scattered stellate hairs, along margin more distinctly pubescent. Stigmas dark.

Wooded riverbanks, in clayey-sandy soil.—*European Part*: Dvina-Pechora. Described from the banks of Bolshoi Pyatok (Vologda Region). Type in Leningrad.

Note. Our description is based on Zahn's incomplete diagnosis.

361. *H. ovalifrons* Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 26; Zahn in Pflzr. IV, 280, 331.

Perennial. Stem 40–50 cm high, 2 mm in diameter, violet at base, pubescence to scattered in lower part with hairs 2 mm long, with occasional glands above. Basal leaves 3–4, obovate, elliptical to lanceolate, with base truncate or abruptly narrowed to petiole, obtuse (sinuate at tip) to short-acuminate, with 3–5 remote, short teeth in

lower half, grass-green, dorsally often violet beneath, sparsely pubescent on both sides and along margin with hairs 0.5–1.5 mm long, hairs dense along midrib beneath and on petiole, 2 mm long, as a whole pubescence scattered; cauline leaves 1–2 (coefficient of leafiness 0.03), lanceolate, with base truncate and 3–4 short teeth in lower half, bottom leaf petiolate, upper sessile. Inflorescence corymbose, with 3–5 capitula; peduncles glabrous, sparsely glandular, glands 0.5 mm long, weakly tomentose. Involucres 10–12 mm long, fleshy; involucral bracts lanceolate, dark green, barbate, with occasional, 3(0–7), hairs 1 mm long, moderately, 57(45–65), glandular, glands 0.3–0.5 mm long, with narrow stellate-hairy border. Stigmas yellow. Flowering July.

Fir forests, mountains.—*Caucasus*: ?Southern Transcaucasia. Described from former Artvin District. Type in Tbilisi.

Cycle 12. Microplacera Juxip.—Involucral bracts with occasional hairs and moderate glands, more or less without stellate hairs.

362. *H. microplacerum* Norrl. in Mela-Cajander. Suom. Kasvio (1906) 694; Zahn in Pflzr. IV, 280, 298 (nota) (em-Juxip).

Perennial. Stem 25–65 cm high, 1–3 mm in diameter, violet at base, sulcate, with occasional to sparse hairs 1.0–2.5 mm long, sparsely glandular at top, sometimes with lateral stems. Basal leaves 5(3–6(–13)), mostly small (but sometimes even to 22 cm long), elliptical to lanceolate with base truncate, obtuse or abruptly narrowed to petiole, short-acuminate (4.5:1), with 4–7 small, triangular, serrate to spinescent teeth, yellowish-green, paler beneath, on both sides densely pubescent with hairs 0.3–1.5 mm long, along margin moderately pubescent, with hairs 1.5–2 mm long and very dense along midrib beneath, as a whole pubescence dense; cauline leaves (0–)1(–2) (coefficient of leafiness 0.02), lanceolate, short-petiolate, acuminate, serrate, often small. Inflorescence corymbose, with 2–15 capitula; peduncles glabrous or with occasional hairs 1 mm long, with scattered to dense glands 0.3–0.7 mm long, tomentose. Involucres (8.5–)9–11(–12) mm long; involucral bracts somewhat narrow, gradually tapered to acuminate tip, dark green, with occasional, 6(1–16), hairs 1 mm long, moderate to dense, 65(45–110), glands 0.5–1.0 mm long, more or less without stellate hairs. Stigmas dark to black. Flowering June to August.

Tundra, coniferous-birch forests, elfin birch woodland, burned forest clearings, shrubby meadows.—*Arctic*: Arctic Europe; *European Part*: Karelia-Lapland, Dvina-Pechora (Northern Urals). *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Cycle 13. *Composita* Juxip.—Involucral bracts with occasional hairs and very dense glands (glands approximately 30 times as many as hairs).

- 317 363. ***H. subcompositum*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 512.

Perennial. Stem 30–50 cm high, 2.0–3.5 mm in diameter, violet at base, sulcate, more or less glabrous, with occasional glands above, stems often 2–3. Basal leaves 3–9, ovate to oblong-lanceolate, to 20 cm long (5.2:1), abruptly and [or] gradually narrowed to petiole, outer leaves with truncate base, 3–7 unequal, small and medium (5–7 mm long) teeth alternately also with free teeth on petiole, grass-green, grayish-glaucous beneath, with occasional (toward margin) hairs above, or without, with scattered pubescence beneath and along margin, moderate along midrib, as a whole scattered-pubescent; cauline leaves 1(–2) (coefficient of leafiness 0.03), narrowly lanceolate, truncate-petiolate, with 3–4 teeth, teeth larger toward base, reduced toward tip, acuminate. Inflorescence openly one-sidedly paniculate, with 2–6 capitula, peduncles more or less glabrous, with scattered glands 0.7 mm long, weakly tomentose. Involucres (8.5–)11.0–11.5 mm long; involucral bracts narrow, acute, with occasional (5) hairs 1 mm long and very dense (145) glands 0.8 mm long, more or less without stellate hairs. Stigmas dark. Flowering July to August.

Spruce and birch forests, elfin birch woodland, stony talus on mountains.—*European Part*: Karelia-Lapland. Endemic. Described from Khibiny [Mountains] (Vudyavrchorr). Type in Kirovsk.

Note. Pubescence as in *H. crassifolium* Dahlst., but glands in the inflorescence as in *H. microplacerum* Norrl.

Cycle 14. *Kreczetoviczia* Juxip.—Involucral bracts with sparse glands, conspicuously stellate-hairy.

364. ***H. kreczetoviczii*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 512.

Perennial. Stem 30–35 cm high, 1–2 mm in diameter, violet at base and sparsely pubescent, glabrous and eglandular (or with occasional glands) above. Basal leaves 3–6, elliptic-lanceolate, with truncate base, broad (2.5:1), scarcely denticulate, grass-green, spotted, violet beneath, moderately pubescent above and along margin with hairs 1 mm long, scattered-pubescent beneath, very densely pubescent along midrib with hairs 2 mm long, as a whole pubescence dense; cauline leaves 2 (coefficient of leafiness 0.06), lanceolate, short-petiolate, acute, broad

(3:1). Inflorescence corymbose, with 5–7 capitula; peduncles with occasional short hairs and occasional glands, with scattered stellate hairs. Involucres 10 mm long; involucral bracts without simple hairs, sparsely, 23(15–30), glandular, with glands 0.3 mm long, distinctly stellate-hairy. Stigmas dark. Flowering July.

Pine forests, rocky slopes, at 1800 m.—*Caucasus*: Ciscaucasia. Endemic. Described from Krasnodar Territory (Abago upland). Type in Leningrad.

318 **Note.** The species is close to *H. furfuraceoides*, from which it is distinguished by having sparse glands on the involucral bracts, shorter involucres, and broad leaves.

Cycle 15. *Uranopolea* Juxip.—Involucral bracts with sparse glands, without stellate hairs.

365. ***H. uranopoleos* Juxip** in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 512.

Perennial. Stem 40–50 cm high, 1.5 mm in diameter, with occasional hairs, eglandular. Basal leaves 3–4, obovate to lanceolate, broad (4:1), abruptly narrowed to petiole, with 5–6 short, remote teeth, subobtuse or short-acuminate, olive-green, glaucescent beneath, to densely pubescent above with hairs 1.2 mm long, moderately to densely pubescent beneath and along margin, very densely so along midrib with hairs 2 mm long, as a whole pubescence dense; cauline leaves 2–3 (coefficient of leafiness 0.05), short-petiolate or sessile, lanceolate, with 5–6 distinct, acute teeth, moderately pubescent. Inflorescence corymbose with 2–5 capitula; peduncles without simple hairs, eglandular, scatteredly stellate-hairy. Involucres 10.5–11.5 mm long, cylindrical; involucral bracts somewhat broad and obtuse, without simple hairs, more or less sparsely, 28(20–38), glandular, glands 0.7–1.0 mm long, more or less without stellate hairs. Stigmas dark. Flowering July.

Forested bluffs.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Taevaskod (Tartu District). Type in Tartu.

Note. In habit, it resembles *H. pleuroleucum* Dahlst., differing from it by having fewer glands on the involucral bracts. It is distinguished from *H. furfuraceoides* Zahn mainly by the absence of stellate hairs on the involucral bracts. An extremely rare species.

Cycle 16. *Furfuracea* Juxip.—Involucral bracts with scattered glands, densely stellate-hairy.

366. **H. furfuraceoides** Zahn in Pflzr. IV, 280 (1921) 329; Asch. and Graebn. Synopsis, XII, II, 462.—*H. furfuraceum* Dahlst. Beitr. Hier.-Fl. Oesels (1901) 31; non Brenn.—**lc.**: Dahlst. (op. cit.) t. III, fig. 2.

Perennial. Stem 45–70 cm high, 1.5–2.5 mm in diameter, reddish at base, more or less glabrous. Basal leaves 3–8, outer small, elliptical, more or less entire, with truncate base, obtuse, inner larger, to 16 cm long, ovate-lanceolate to lanceolate (4.5:1), narrowed to long, winged petiole or with more or less truncate base, denticulate with remote teeth, long-acuminate, dark green, paler beneath often violet, glabrous
319 (almost) above, sparsely pubescent beneath with hairs 1 mm long, pubescence scattered along margin, dense along midrib beneath, hairs 1.5 mm long, as a whole scattered-pubescent; cauline leaves (0)1–2(–3) (coefficient of leafiness 0.03), lanceolate, like inner basal leaves, short-petiolate or sessile, acute. Inflorescence paniculate, with 6–16 capitula; peduncles without simple hairs, with occasional glands, tomentose. Involucres 10.5–12.0 mm long, cylindrical; involucral bracts linear, narrow, acute, without simple hairs, with scattered, 37(35–45), glands 0.5–0.7 mm long, densely stellate-hairy. Stigmas greenish-brown. Flowering June to July.

Wooded meadows.—*European Part*: Baltic Region (western part of Estonian SSR). Endemic. Described from Saaremaa Island (Oesel). Type in Stockholm; cotype in Riga.

Note. According to Dahlstedt (l. c.), this species is intermediate between *H. sparsidens* Dahlst. and *H. integratum* Dahlst. A rare plant.

367. **H. retroversilobatum** Schelk. and Zahn in Izv. Kavk. Muzeya, VII (1912) 135; Zahn in Pflzr. IV, 280, 318.

Perennial. Stem 30–40 cm high, 1.5–2.0 mm in diameter, sulcate, violet at base and somewhat (to sparsely) pubescent, sparsely glandular and stellate-hairy above. Basal leaves 3–5, small (to 7 cm long), elliptical or ovate, broad (2.5:1), with base cordate or truncate, with large (lobed) recurved teeth, with 3–5 distinct papillate or serrate teeth, obtuse or short-acuminate, grass-green, paler beneath, glabrous (almost) above, hairs sparse beneath, 0.3–0.6 mm long, scattered along margin, 0.6–1.0 mm long, densely pubescent along midrib beneath with hairs 1.5 mm long, as a whole to moderately pubescent; cauline leaves 1(–2) (coefficient of leafiness 0.04), ovate-lanceolate, short-petiolate, toothed, acute, scatteredly pubescent, upper small, sessile. Inflorescence corymbose, with 3–4(–12) capitula; peduncles without simple hairs, with scattered to moderate glands 0.3–0.5 mm long, weakly tomentose. Involucres 10.0–11.5 mm long (according to Zahn 8.0–9.5 mm long); involucral bracts narrow, acute, glabrous, with scattered, 40(35–60), glands 0.5(–1.0) mm long, along margin densely

stellate-hairy, tufted. Stigmas yellowish-brown. Flowering July. (Plate XXIX, Fig. 2.)

Mixed forest, at 1200–2100 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Abakur Pass (Kutaisi Region). Type in Leningrad.

Note. In habit this species resembles *H. cardiophyllum* Jord.

Cycle 16. *Frigidella* Juxip.—Involucral bracts with scattered glands, without stellate hairs.

368. ***H. frigidellum*** Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 141; Zahn in Pflzr. IV, 280, 301.

320 Perennial. Stem 25–50 cm high, 1–3 mm in diameter, violet at base, with occasional hairs, with occasional glands above, somewhat stellate-hairy. Basal leaves 1–5, elliptical to lanceolate, attenuate to quite long petiole or with truncate base, short-acuminate, deniculate, yellowish-green, with up to scattered hairs 0.3–1.0 mm long above and along margin, moderately pubescent beneath, densely so along midrib, hairs 1.5–2.5 mm long, as a whole pubescence moderate; cauline leaves 0–1(–2) (coefficient of leafiness 0.03), lanceolate, bottom leaf narrowed to short, winged petiole, upper sessile, long-acuminate, stellate-hairy beneath. Inflorescence corymbose, with 3–10 capitula; peduncles glabrous, with sparse to scattered (as an exception to dense) glands 0.4–0.7 mm long, scattered-tomentose. Involucres 8.5–10.5 mm long, ovate; involucral bracts somewhat broad, somewhat obtuse, very dark, without simple hairs, scatteredly, 40(30–50), glandular, glands 0.5–0.7 mm long, along margin sparsely stellate-hairy. Stigmas dark. Flowering June to August.

Subalpine zone of tundra, elfin-birch woodland, edges of pine-birch and spruce forests.—*Arctic*: Arctic Europe; *European Part*: Karelia-Lapland, Dvina-Pechora (Urals). Endemic. Described from mouth of Severnaya Dvina River. Type in Leningrad.

369. ***H. adenoactis*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 513.

Perennial. Stem 15–25 cm high, 1.0–1.5 mm in diameter, violet at base, to sparse pubescence, glandular above. Basal leaves 5–7, elliptical to lanceolate, abruptly narrowed to petiole or base of lamina truncate, short-acuminate, broad (3:1), to 11 cm long, more or less entire, on both sides with dense hairs 0.5–1.5 mm long, moderately pubescent along margin, very densely so along midrib beneath with hairs 2 mm long, as a whole pubescence very dense; cauline leaves 1 (coefficient of leafiness 0.05), lanceolate, sessile, small. Inflorescence paniculate-corymbose, with 3–7

capitula; peduncles without simple hairs, densely glandular, glands 0.5 mm long, tomentose. Involucres 9.5 mm long; involucral bracts linear, acute, without simple hairs, with scattered (40) glands 0.5 mm long, weakly stellate-hairy (at base). Stigmas yellow. Flowering July.

Edges of pine forests, in mountains.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from Abas-Tuman. Type in Leningrad.

Note. It is distinguished from the closely related *H. retroversilobatum* Schelk. and Zahn by having more or less entire leaves and densely glandular peduncles.

Cycle 18. Integrata Juxip.—Involucral bracts moderately glandular, with distinct stellate hairs; leaves more or less entire or very denticulate.

- 321 370. *H. declivium* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 513; Norrl. Hier. exs. fasc. IX, No. 77, nom. nud.

Perennial. Stem 20–55 cm high, 1–3 mm in diameter, sulcate, violet at base, more or less glabrous, with occasional glands above and somewhat stellate-hairy. Basal leaves 2–5, elliptical to broadly lanceolate, to 16 cm long (3.5:1), with base truncate or abruptly narrowed to small petiole, obtuse to short-acuminate, with very small, spinescent (3–10) teeth (at first glance leaf looks entire), on both sides and along margin moderately pubescent with hairs 0.5–1.2 mm long, densely hairy along midrib beneath, as a whole to densely pubescent, olive-green, somewhat violet beneath; cauline leaves 0–1 (coefficient of leafiness 0.02), lanceolate, attenuate to short petiole, with long-acuminate (sometimes small) tip, on both sides glabrous as a whole pubescence very sparse (1/4–1/5 as many as in basal leaves), stellate-hairy (particularly beneath). Inflorescence loosely corymbose, with 3–7 capitula, partly undeveloped; peduncles glabrous, with scattered glands 0.7 mm long, more or less tomentose. Involucres 8–12 mm long; involucral bracts narrow, subobtuse to acute, dark, glabrous, moderately, 64(50–100), glandular, glands 0.5–1.5 mm long, densely stellate-hairy. Stigmas yellowish-brown. Flowering July to August.

Slopes, cut-over forests in tundra and mountains.—*European Part*: Karelia-Lapland, Volga-Kama (Urals). Endemic. Described from Kola Peninsula (Ponoi). Type in Helsinki; paratype in Leningrad.

Note. This plant, collected in 1889 from the Kola Peninsula by Yu. Montell and distributed by Norrlin in 1907 (Hier. exs. fasc. IX, No. 77) under the name *H. declivium* Norrl., apparently remained unpublished. In the light of this fact, we have described this plant on the basis of the distributed specimen, retaining the name given it by Norrlin.

371. **H. cinereostriatum** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 26; Zahn in Pflzr. IV, 280, 329.

Perennial. Stem 40–65 cm high, 3 mm in diameter, sulcate, with scattered hairs 2.5 mm long at base, with occasional glands and conspicuously stellate-hairy above. Basal leaves 5–6, ovate or ovate-lanceolate, to 20 cm long, with obtuse or truncate base, petiolate, obtuse to acuminate, often curved at tip, broad (3:1), very finely toothed (conspicuous only at base, in upper half more or less entire), on both sides more or less glabrous, along margin scatteredly pubescent, moderately so beneath, as a whole with scattered short pubescence; cauline leaves 2(–3) (coefficient of leafiness to 0.05), petiolate, like basal leaves, acute. Inflorescence paniculate, with (up to) 12 capitula; peduncles without simple hairs, scatteredly glandular, tomentose. Involucres 10–12 mm long; involucre bracts narrow, acute, greenish, glabrous, barbate, moderately (60) glandular, glands 0.6 mm long, along margin distinctly stellate-hairy. Stigmas yellow. Flowering July.

Montane forests.—*Caucasus*: ?Southern Transcaucasia. *General distribution*: Eastern Anatolia. Endemic. Described from former Artvin District. Type in Tbilisi.

372. **H. diminuens** Norrl. Bidr. Skand. Hier.-Fl. I (1888) 87; Norrl. in Mela-Cajander, Suom. Kasvio, 692; Zahn in Pflzr. IV, 280, 328 (nota); Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 618; Samuelsson, Maps of Scand. Hier. sp. No. 52.—*Exs.*: Norrl. Hier. exs. fasc. V, No. 91.

Perennial. Stem 40–60 cm high, 2 mm in diameter, green, more or less glabrous, with occasional glands above, distinctly stellate-hairy throughout (above densely). Basal leaves 2–4, outer small, elliptical, obtuse, others ovate to lanceolate, acute, to 17 cm long (3.5:1), with obtuse or truncate base, grass-green, glaucescent beneath, denticulate with remote teeth (teeth more conspicuous at base), with very dense hairs above, 0.3–0.6 mm long, moderately pubescent beneath along margin with hairs 1.0–1.5 mm long, very densely pubescent along midrib beneath and on petiole with hairs 1.0–2.5 mm long, as a whole densely pubescent; very sparsely stellate-hairy along midrib beneath; cauline leaves 0–1 (coefficient of leafiness 0.01), small, narrowly lanceolate, long-acuminate, sparsely stellate-hairy on both sides (or only beneath). Inflorescence corymbose-paniculate, with 3–12 capitula; peduncles glabrous, moderately glandular, grayish-tomentose. Involucres 9–10 mm long; involucre bracts narrow, subacute, dark, glabrous or with occasional (3–5) hairs, moderately, 56(50–80), glandular, glands 0.4–0.6 mm long, at base and along margin to tufted tip distinctly stellate-hairy. Corollas yellow. Stigmas dark.

Forest edges and forests, mountains to elfin birch woodland.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. Samuelsson (*Maps of Scand. Hier.* (1954) No. 52) makes the following comment on the general distribution map of *H. obtextum* Dahlst. and *H. diminuens* Norrl.: "...these two species possibly are identical," which in fact may be so, since we did not notice any significant differences in the specimens of both species examined by us.

373. **H. hjeltii** Norrl. Herb. Mus. Fenn. ed. 2 (1889) 151; in Mela-Cajander, Suom. Kasvio, 697; Zahn in Pflzr. IV, 280, 321; Joh. and Sam. Dalarn. Hier. Silvaticif. 32; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 618; Samuelsson, Maps of Scand. Hier. sp. No. 40.—*H. ptychophyllum* Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II (1893) 116.—*H. orbicans* C.G. Westerl. in Ronnebytr. Fa. Fl. (1890) 113.—**Exs.**: Norrl. Hier. exs. fasc. VI, Nos. 5–7; Dahlst. Hier. Scand. cent. XII, No. 66.

- 323 Perennial. Stem 35–70 cm high, 1.5–4.0 mm in diameter, in basal part sparsely pubescent, with occasional hairs and to sparse glands above, vigorous specimens often branched. Basal leaves 2–9, large, to 26 cm long (4:1). ovate or elliptical, lamina base abruptly narrowed and then more or less truncate, with long, winged petiole, scarcely fine-toothed (at first glance appearing entire) or short-serrate, light (yellowish) green, often violet beneath, sparsely pubescent above with hairs 0.6 mm long, hairs scattered beneath, 1 mm long, very dense hairs along midrib beneath, 1.5–2.5 mm long, as a whole moderately pubescent (pubescence quite variable: shade specimens can be considerably less pubescent); cauline leaves (0–)1(2) (coefficient of leafiness 0.02), elliptical to lanceolate, petiolate, broad (4:1), acuminate, like inner basal leaves in shape, from 1/3 to 1/2 height of stem. Inflorescence corymbose, with 4–12(–20) capitula; peduncles glabrous, to moderately glandular, tomentose. Involucre 8–10 mm long, cylindrical; involucre bracts somewhat broad, subacute, glabrous, moderately to densely, 65(45–90), glandular, glands 0.6–1.2 mm long, densely stellate-hairy (in shade plants pubescence less conspicuous). Corolla teeth (particularly those of disk florets) ciliate. Stigmas yellow, but dark on drying. Flowering June to July.

Shady slopes of eskers and moraines, on rich humic soil.—*European Part*: Baltic Region, Ladoga-Ilmen. *General distribution*: Scandinavia. Endemic. Described from Finland. Type in Helsinki.

Note. The leaves of this species are often infected with the fungus *Puccinia hieracii* (Schum) Mart.

Cycle 19. *Carcarophylla* Juxip.—Involucral bracts moderately glandular, distinctly stellate-hairy; leaves coarsely toothed.

374. ***H. carcarophyllum*** K. Joh. in Joh. and Sam. Dalarn. Hier. Silvaticif. (1923) 14; Asch. and Graebn. Synopsis, XII, II, 448.—*H. carcarophyllum* K. Joh. in Sv. Vet.-Ak. Bih. Bd. 28, III, No. 7 (1902) 42; Zahn in Pflzr. IV, 280, 314.—**lc.**: K. Joh. Arch. Siljanstr. (l. c.) t. III, fig. 8.—**Exs.**: Dahlst. Hier. Scand. cent. XIV, No. 9; K. Joh. Plant. Scand. (15.VII.1904) ex Dalarne.

324 Perennial. Stem 35–60 cm high, 1.5–2.5 mm in diameter, reddish at base, sulcate, to sparsely pubescent, with occasional glands above. Basal leaves 2–6, ovate to ovate-oblong, long-petiolate, to 23 cm long, with cordate, truncate or sagittate base, subobtusate or very short-acuminate (4:1), with many (5–10) unequal, deep, and coarse teeth (small and large, 10–15 mm long, papillose teeth alternating), acute, almost lobed at base, recurved, dark (grayish) green, often violet beneath, on both sides with hairs 0.3–1.0 mm long, along margin moderately to densely pubescent with hairs 1.5–2.0 mm long, very densely hairy along petiole with hairs 3 mm long, as a whole moderately (to densely) pubescent; cauline leaves 1(–2) (coefficient of leafiness 0.03), bottom leaf ovate, petiolate, acute, like inner basal leaf, upper leaf narrowly lanceolate, narrowed to sessile base, small. Inflorescence corymbose, with 3–8 capitula; peduncles glabrous, to scatteredly glandular, glands 0.4 mm long, with scattered stellate hairs. Involucres 8.5–10.0 mm long, ovate; involucral bracts narrow, acute, dark green, with green border, glabrous, to moderately, 50(38–55), glandular, glands 0.7 mm long, densely stellate-hairy (particularly along margin). Stigmas dark. Flowering May to June. (Plate XXX, Fig. 1.)

Open forests.—*European Part*: Upper Dnieper. *General distribution*: Scandinavia, Central Europe. Described from Sweden (Dalarne). Type in Stockholm (or Uppsala).

Note. Although *H. cacarophyllum* is the prior name, the author of the species himself changed its name to *H. carcarophyllum* (exsic. 1900), and this name was retained also afterward. Following him (and Zahn. *Synopsis* l. c.), we accept the latter name. In this connection Zahn makes the following comment however in the *Synopsis* (foot-note): “It would have been more correct to write *carcharophyllum*” (from the words *carcharos*—sharp and *phyllon*—leaf).

375. ***H. cardiophyllum*** Jord. ex Sudre. Hier. du Centre de la France (1902) 75, t. XXIII.—*H. card.* var. *acutisquamum* Litw. and Zahn in Schedae HFR fasc. XLII (1910) 18; Pflzr. IV, 280, 319.—*H. silvaticum*

Somm. and Lev. in Acta horti Petropol. XVI (1900) 303, non al.—**Exs.:** GRF No. 2088.

Perennial. Stem 25–50 cm high, 1.0–2.5 mm in diameter, violet at base, sulcate, more or less glabrous, sparsely glandular above. Basal leaves 3–9, ovate, to 13 cm long, broad (2.5–3:1), with deeply cordate or truncate base, obtuse or short-acuminate, petiolate, with small or large, unequal, papillose or sharply serrate teeth, often recurved at base, with free teeth on petiole, with sparse hairs 0.5 mm long above, scattered-pubescent beneath and along margin with hairs 1.0–1.5 mm long, densely so along midrib and petiole with hairs 1.5–2.0 mm long, as a whole moderately pubescent, sometimes with stellate hairs; cauline leaves 1(0–2) (coefficient of leafiness 0.03), bottom leaf like inner basal leaf, but usually small, broad (2.5–3:1), acute, toothed. Inflorescence corymbose, with 3–15 capitula; peduncles without simple hairs, with scattered (to moderate), glands 0.5 mm long, more or less tomentose. Involucres 325 10–11 mm long; involucre bracts somewhat narrow, acute, to subulate, without simple hairs, moderately, 50(40–60), glandular, glands 0.6–1.0 mm long, along margin moderately stellate-hairy, barbate. Stigmas yellow, later turning more or less brown. Flowering July to August.

Subalpine pine forests and meadows, at 2160–2460 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from Teberda. Type in Leningrad.

376. **H. floccicomatum** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 27; Zahn in Pflzr. IV, 280, 316.

Perennial. Stem 25–55 cm high, 2–4 mm in diameter, in basal part moderately hairy, with hairs 2.5 mm long, with occasional glands above, quite densely stellate-hairy. Basal leaves 4–5, ovate, obtuse and oblong, subacute, with base abruptly narrowed to petiole or truncate, quite large, with remote, crenate, broadly triangular, papillose, obtuse, spinescent or sharply serrate teeth, green, grayish beneath, with occasional hairs above, with sparse, short hairs 0.5–0.8 mm long beneath, as also along margin, densely pubescent along midrib beneath and on petiole with hairs 1.5 mm long, as a whole with scattered (to moderate) pubescence; cauline leaves 1–2 (coefficient of leafiness 0.04), broad, ovate-oblong, acuminate, at base usually coarsely toothed (bottom leaf often large, short-petiolate, upper sessile), stellate-hairy beneath. Inflorescence openly paniculate, with 2–5(–12) capitula; peduncles slender, without simple hairs, moderately glandular, glands 0.5 mm long, densely tomentose. Involucres 10.5 mm long; involucre bracts green, with pale border, glabrous, moderately (60) glandular, glands to 1 mm long, along margin to apical tuft narrowly but densely stellate-hairy. Stigmas yellowish-brown. Flowering July.

Edges of montane forests.—*Caucasus*: ?Southern Transcaucasia. Described from former Artvin District. Type in Tbilisi.

Cycle 20. Medianiformia Juxip.—Involucral bracts moderately glandular, without stellate hairs.

377. *H. medianiforme* Litw. and Zahn in Fedde, Repert. IV (1907) 236; Zahn in Pflzr. IV, 280, 300.

326 Perennial. Stem 30–65 cm high, 1.0–3.5 mm in diameter, somewhat flexuous, violet at base, with occasional or sparse (sometimes to scattered) hairs 2.5–3.0 mm long, eglandular or with occasional glands above and more or less stellate-hairy. Basal leaves 2–5, elliptical to oblong-lanceolate, abruptly or shortly-attenuate to long petiole, obtuse to acuminate, often broad (2.5–4:1), unequally bluntly or sharply serrate with 4–10 teeth, dull green, paler beneath, moderately pubescent on both sides and along margin, with hairs 0.5–1.5 mm long (but sometimes with occasional hairs), pubescence to very dense along midrib beneath, as a whole moderately to densely pubescent; cauline leaves 1–2 (coefficient of leafiness 0.03), bottom leaf short-petiolate, irregularly and often coarsely toothed, upper sessile small. Inflorescence openly paniculate, with 2–12(–25) capitula; peduncles mostly glabrous, with sparse glands 0.3–0.5 mm long, slightly stellate-hairy. Involucres (9–)10–11 mm long, ovate, later truncate; involucral bracts irregularly petiolate, somewhat narrow to acute, dark, (almost) without hairs (0–1) moderately, 50(40–60), glandular, glands 0.6–0.7 mm long, more or less without stellate hairs. Stigmas dark. In habit, the plant resembles *H. vulgatum*. Flowering June to August.

Beech and birch montane forests.—*Caucasus*: Ciscaucasia, Eastern and Western Transcaucasia. Endemic. Described from vicinity of Pyatigorsk (Beshtau). Type in Leningrad; cotype in Tbilisi.

378. *H. ovatifrons* Dahlst. ex Noto Tromsø amts Hier.-fl. I (1910) 36; Zahn in Pflzr. IV, 280, 290 (nota).

Perennial. Stem 30–40 cm high, 1–2 mm in diameter, violet at base, more or less without simple hairs, sparsely glandular above, somewhat stellate-hairy. Basal leaves 2–5, small, orbicular, elliptical to lanceolate, obtuse to short-acuminate, short-petiolate, with truncate, obtuse or abruptly narrowed base, with 4–7 small serrate teeth, olive-green, violet beneath, densely pubescent on both sides and along margin with hairs 0.2–1.0 mm long, with very dense hairs along midrib beneath 1.5 mm long, as a whole very densely pubescent; cauline leaves 1(–2) (coefficient of leafiness 0.03), lanceolate, narrowed to short petiole, acute. Inflorescence corymbose, with 3 capitula; peduncles glabrous or

with occasional hairs, moderately glandular, glands 0.5 mm long, tomentose. Involucres 9.0–11.5 mm long; involucre bracts lanceolate, acuminate, dark, with light-colored border, glabrous, moderately, 58(50–65), glandular, glands 0.4–1.0 mm long, without stellate hairs. Stigmas dark. Flowering August.

Tundra, forest and subalpine zones.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia. Described from Norway. Type may or may not be in Oslo?

379. **H. pleuroleucum** Dahlst. Beitr. Hier.-Fl. Oesels (1901) 30; Zahn in Pflzr. IV, 280, 323; Asch. and Graebn. Synopsis, XII, II, 424.—**lc.**: Dahlst. op. cit. t. IV, fig. 1 (folia).

Perennial. Stem 35 cm high, 1 mm in diameter, more or less glabrous, sparsely glandular above. Basal leaves 4, Ovate or elliptical, with cordate or truncate base or abruptly narrowed to petiole, obtuse or short-acuminate, long-petiolate, broad (3:1), with 4–6 small teeth (more conspicuous on inner leaves and toward base), olive-green, silver-green beneath, on both sides with sparse, hairs 0.6–0.8 mm long, 327 densely pubescent along margin with hairs 0.6 mm long, hairs very dense along midrib beneath with hairs 2 mm long, as a whole to densely pubescent; cauline leaves 1 (coefficient of leafiness 0.03), in lower fourth of stem, lanceolate, truncate, petiolate, with conspicuous, fine, sharp teeth, acute, with scattered stellate hairs beneath. Inflorescence corymbose, with 4 capitula; peduncles without simple hairs, moderately glandular, scatteredly stellate-hairy. Involucres 10–11 mm long; involucre bracts linear, subobtuse, blackish, glabrous, moderately (53) glandular, glands 1 mm long, (almost) without stellate hairs (outer bracts with narrow stellate-hairy border). Stigmas dull-green, later dark. Flowering June to August.

Deciduous forests on calcareous soil.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Saaremaa Island (Oesel). Type in Riga.

Note. Since K. Kupffer, who collected this plant, no one has found it.

Cycle 21. Gentilia Juxip.—Involucre bracts densely glandular, mostly weakly stellate-hairy; peduncles mostly with scattered to moderate glands.

380. **H. pomoricum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 514.

Perennial. Stem 45–55 cm high, 2 mm in diameter, sulcate, violet at base, more or less glabrous, with occasional glands above. Basal

leaves 5–6, rosulate, ovate, elliptical, to oblong-lanceolate, with truncate base, rather long-petiolate, finely (at base conspicuously, sharply toothed with short teeth, short-acuminate), to 16 cm long (4:1), grassy-blue-gray, glaucous beneath, glabrous above, with sparse hairs 0.4–0.5 mm long beneath and along margin, along midrib beneath with scattered hairs 1 mm long, as a whole pubescence sparse; cauline leaves 1 (coefficient of leafiness 0.02), lanceolate, petiolate, with many fine teeth, acuminate, like basal leaves in other characters. Inflorescence corymbose, with 4 capitula; peduncles glabrous, with occasional glands 0.4 mm long, tomentose. Involucres 9.5 mm long; involucral bracts narrow, acute, glabrous, densely (83) glandular, glands 0.7 mm long, (almost) without stellate hairs (sparse hairs along margin and at base). Stigmas yellow. Flowering July.

Pine forests.—*European Part*: Karelia-Lapland. Endemic. Described from banks of Segozero Lake. Type in Leningrad.

Note. It is distinguished from the closely related *H. exotericum* Jord. by peduncles with occasional glands and sparsely pubescent leaves.

381. **H. exotericum** Jord. ex Bor. Fl. Centr. France ed. 3, II (1857) 417; Sudre, Hier. du Centre de la France, 74, t. XXIII: Zahn in Pflzr. IV, 280, 315; Asch. and Graebn. Synopsis, XII, II, 452.—*H. syngenes* Jord. l. c.

328 Perennial. Stem 30–60(–80) cm high, 1.5–3.0 mm in diameter, reddish-violet at base, sparsely pubescent, with sparse glands above. Basal leaves 5–8, ovate to ovate-lanceolate, to 15 cm long, broad (2–3:1), with cordate, obtuse, or truncate base, often large, subobtuse, inner leaves acuminate, crenate, with small, broadly triangular teeth, larger and coarser at base, often recurved, smaller toward tip, sharply serrate, sometimes with free teeth on more or less long petiole, bluish- or yellowish-green, sparsely to scatteredly short-pubescent above with hairs 0.3–0.5 mm long, or glabrous, to moderate-pubescence beneath and along margin, with hairs 0.6–1.0 mm long, very dense along midrib beneath and on petiole, as a whole pubescence to dense; cauline leaves 1(–2) (coefficient of leafiness 0.03), bottom leaf with cordate or truncate base, acuminate, more conspicuously toothed at base, often with narrow, acute, more or less incised teeth, moderately to densely pubescent, stellate-hairy along midrib beneath. Inflorescence open spreading panicle, with 5–18 capitula; peduncles without simple hairs, with scattered glands, tomentose. Involucres 10–11 mm long, cylindrical; involucral bracts somewhat narrow, acute to very acute, barbate, glabrous, densely, 80(60–100), glandular, glands 0.6–1.2 mm long,

somewhat stellate-hairy at base and along margin. Stigmas yellow (turning brown). Flowering May to July.

Subalpine pine forests, to 2380 m.—*Caucasus*: Ciscaucasia (Teberda), Eastern, Western and Southern Transcaucasia (former Artvin District), Dagestan. *General distribution*: Central Europe, Atlantic Europe, Mediterranean (western) Region. Described from France. Type in Lyons?

Note. Zahn (*Hieracia Florae Mosquensis*, 1911, 64) reported the distribution of *H. exotericum* Jord. in the Moscow Region. However, a critical examination of these specimens revealed them to be *H. gentile* Jord. (with dark stigmas). As a result of this finding, his note in Pflzr. (op. cit.) about the distribution of *H. exotericum* Jord.: "... up to Poland and Central Russia: Podolsk, Moscow etc." also becomes irrelevant.

382. **H. hylocomum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 514.

Perennial. Stem 25–40 cm high, 1.5 mm in diameter, more or less glabrous, somewhat glandular above. Basal leaves 7–10, broadly ovate, elliptical to lanceolate, to 10 cm long (3:1), abruptly narrowed to short petiole, obtuse to acute, with few small teeth, glaucous, very sparsely pubescent above with short hairs 0.3 mm long, to densely pubescent beneath, hairs 1 mm long, to moderately pubescent along margin and midrib, as a whole to moderately pubescent; cauline leaves 0–1 (coefficient of leafiness 0.03), narrow, sessile. Inflorescence paniculate, with 5–9 capitula; peduncles without simple hairs, with scattered glands, tomentose. Involucres 9 mm long; involucral bracts more or less broad, obtuse, glabrous, moderately, 70(60–85), glandular, glands 0.4–0.2 mm
329 long, without stellate hairs. Stigmas dark. Glands reduced toward tips of bracts and clustered botryoidly. Flowering July.

Open pine forests on calcareous-stony soil.—*European Part*: Baltic Region. Endemic. Described from Saaremaa Island (Oesel). Type in Tartu.

Note. Distinguished from the closely related *H. pellucidum* Laest. by having basal leaves with an abruptly narrowed (but not truncate) base.

383. **H. pellucidum** Laest. Sv. Vet. Ak. Handl. (1824) 172; Wahlbg. Fl. Suec. II, 194; Dahlst. Beitr. Hier.-Fl. Oesels, 29; Zahn in Pflzr. IV, 280, 288; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 618; Asch. and Graebn. Synopsis, XII, II, 365; Samuelsson, Maps of Scand. Hier. sp. No. 56.—*H. silvaticum* ssp. 9 Almqu. Stud. (1881) XVIII.—*H. melanolepsis* Almqu. ex Norrl. Bidr. Skand. Hier.-Fl. I (1888) 87; Mela-Cajander,

Suom. Kasvio, 690.—*H. nigro glandulosum* Lönnr. in Öfvers. Vet.-Akad. Förh. No. 4 (1882) 72; nec Vukot.—*H. silvaticum* Gouan δ . *pellucidum* Almqu. ex Williams, Prodr. fl. Brit. III (1902) 135.—**Exs.:** Dahlst. Hier. exs. I, No. 58, IV, No. 58; Hier. Scand. cent. I, Nos. 31, 32; Norrl. Hier. exs. fasc. V, Nos. 57–62; Bunge, fl. exs. No. 462b, sub. *H. plumbeum* Fr. p. p.

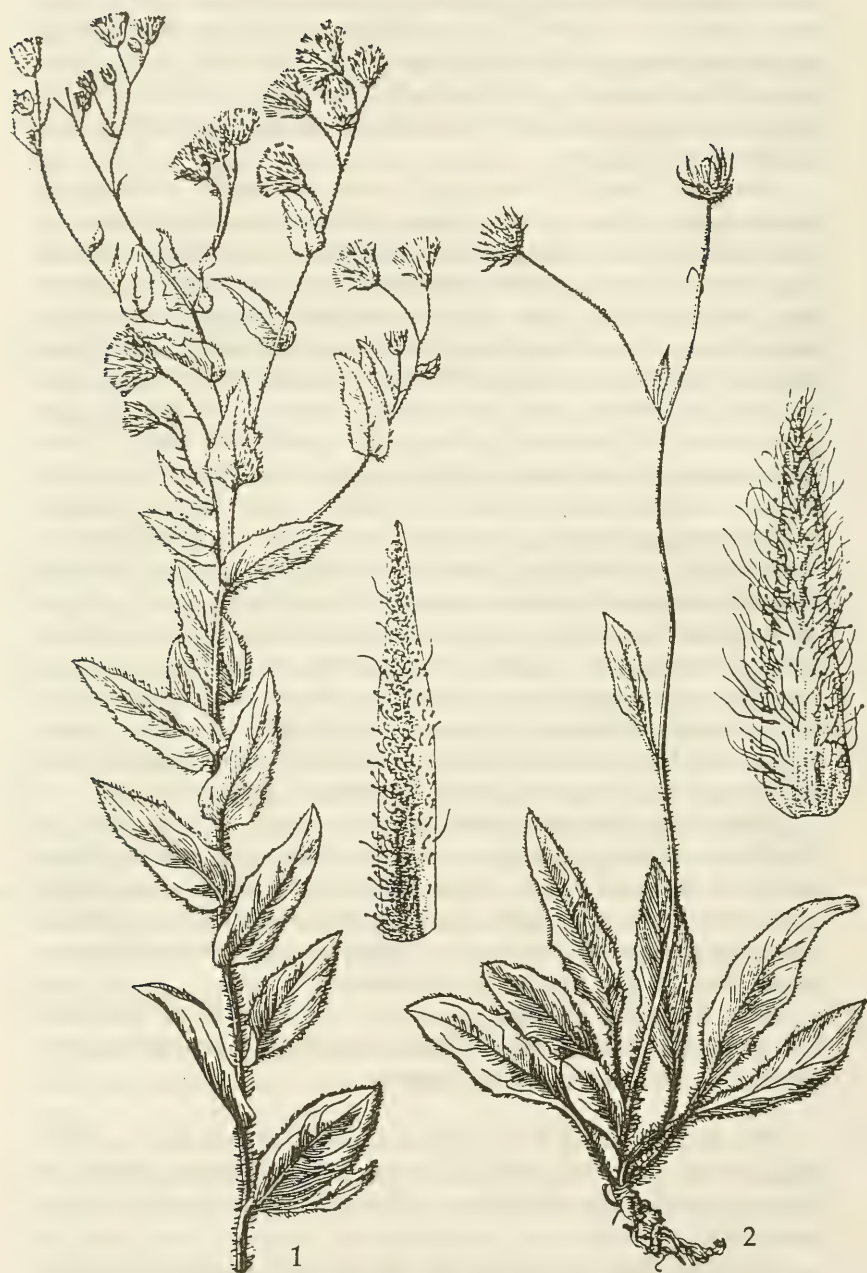
Perennial. Stem 35–70 cm high, 1–3 mm in diameter, reddish-violet at base, sulcate, more or less glabrous, with occasional glands above. Basal leaves 3–10, rosulate, outer small, almost rotund, inner larger (to 25 cm long), ovate to broadly lanceolate (4:1), with cordate or truncate base, long-petiolate, obtuse to short-acuminate (in dried specimens, leaves thin, scarious-transparent), with remote fine teeth (at first glance appearing entire), more distinct at base and somewhat recurved, with free teeth on petiole, dark, grass-green, reddish-violet beneath, glabrous above, with scattered pubescence beneath with hairs 0.8 mm long, moderately pubescent along margin with hairs 0.7 mm long, densely so along midrib beneath with hairs 1.5 mm long, as a whole to moderately pubescent; cauline leaves (0–)1(–2) (coefficient of leafiness 0.02), in middle of stem, resembling inner basal leaf in shape and pubescence. Inflorescence paniculate-corymbose, with 3–14 capitula; peduncles without simple hairs, with scattered glands, tomentose. Involucres short (7–)8–9(–10) mm long, broader than long; involucre bracts somewhat broad, somewhat obtuse, blackish, with apical tuft, glabrous, moderately to densely, 70(45–90), glandular, glands 0.5–0.6 mm long, more or less without stellate hairs. Stigmas dark. Flowering June to August (second flowering in September).

Shady deciduous and mixed forests on stony soil, on rocks, in elfin birch woodlands, in meadows overgrown with shrubs.—**European Part:** Karelia-Lapland, Dvina-Pechora (western), Ladoga-Ilmen, Baltic Region, Upper Dnieper, Upper Dniester, Volga-Kama (western). **General distribution:** Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type in Stockholm?

330 **Note.** According to Norrlin (op. cit.), *H. cajanderi* Norrl. (*Hier. exs. fasc. V*, No. 63), found in the Karelian ASSR (former Olonets Province), should also be included in this species.

384. **H. distractum** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 691; Zahn in Pflzr. IV, 280, 322 (nota).—*H. stenstroemii* Brenn. in Meddel. Acta Soc. Fl. et Fa. Fenn. (1904) 139.—**Exs.:** Norrl. Hier. exs. fasc. V, Nos. 66–70.

Perennial. Stem 35–70 cm high, 1.5–3.0 mm in diameter, usually violet at base, with occasional to sparse hairs, sparsely glandular above. Basal leaves 5(3–11), obovate, elliptical to broadly lanceolate,



mostly abruptly narrowed to quite long petiole or with truncate base, to 24 cm long (4:1), mostly obtuse, orbicular, only inner leaves acute, with remote, usually small teeth, sometimes with free teeth on petiole, scatteredly short-pilose above, hairs 0.3–0.5 mm long, moderately pubescent beneath and along margin with hairs 0.8–1.0 mm long very dense hairs 1.5–2.0 mm long along midrib beneath, as a whole to densely pubescent, light (or dark) grass-green, glaucescent, paler, or violet beneath; cauline leaves 0–1(–2) (coefficient of leafiness 0.02), in middle of stem, distinctly petiolate, with truncate base, more distinctly toothed, particularly at base (sometimes with free teeth on petiole), acute, moderately pubescent, dorsally along midrib somewhat stellate-hairy. Inflorescence open, spreading, paniculate, corymbose, with 6(13–15) capitula, with upward-turned branches; peduncles without simple hairs, moderately to densely glandular, more or less tomentose. Involucres (8–)10–12 mm long; involucre bracts somewhat narrow, subobtusely, glabrous, to densely, 70(45–110), glandular, glands 0.7 mm long, more or less without stellate hairs. Stigmas dark. Flowering June to August (sometimes flowering again in fall—September to October).

Hills overgrown with coniferous or mixed forest, sandy and stony steep banks of rivers and lakes, along burned forest clearings.—*European Part*: Karelia-Lapland, Ladoga-Ilmen, Baltic Region, Upper Dnieper. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki; paratype in Leningrad.

Note. Norrlin in his diagnosis (l. c.) says that the involucre bracts "... sometimes also have occasional dark hairs" (in addition to the glands). But he also mentions the considerable number of stellate hairs along the margin of the bracts. However, in specimens examined by us and identified by both Norrlin and Dahlstedt, neither simple hairs nor a considerable number of stellate hairs could be found on the involucre bracts.

333 In habit, *H. distractum* Norrl. resembles *H. hjeltii* Norrl. and is distinguished from the latter by much larger involucre, absence of stellate hairs on the involucre bracts, and denser pubescence of the leaves.

385. **H. gentile** Jord. ex Bor. Fl. Centr. France, ed. 3, II (1857) 415; Sudre. Hier. du Centre de la France, 71, t. XXII; Zahn, Hier. fl. Mosquens. 64; Zahn in Pflzr. IV, 280, 310; Asch. and Graebn. Synopsis, XII, II, 440.—*H. setaceodentatum* Rehm. and Wol. Flora Pol. exs. No. 198 p. p.—**lc.**: Zahn in Pflzr. (l. c.) fig. 28, T.; van Soest., Hier. Nederl. I, fig. 14.—**Exs.**: GRF Nos. 2087, 2243; Zahn, Hier. Europ. Nos. 36, 37, 233, 234, 351.

Perennial. Stem 45(25–70) cm high, 1.5–5.0 mm in diameter, sulcate, reddish-violet at base, scatteredly pubescent (at base often densely) or sparsely (to scatteredly)—var. *silvivagum* Jord., to sparsely glandular above. Basal leaves 5(2–9), rotund-ovate or broadly cordate-ovate, on average 15 cm (to 25 cm) long, broad (4:1), base distinctly cordate or truncate, with rather long petiole, usually with fine or short, sharp teeth, but at base with more or less large, often recurved teeth, hence leaf looking sagittate or with free teeth on petiole, grass-green, sometimes violet beneath, pubescent above with dense, soft hairs 0.4–0.6 mm long, dense hairs 1 mm long beneath, moderately pubescent along margin, hairs 1 mm long, very dense hairs 1.5–3.0 mm long along margin beneath and on petiole, as a whole very densely pubescent (typical form) or on both sides and along margin scattered-pubescent and only along midrib beneath (and on petiole) very densely pubescent, as a whole to densely pubescent (var. *silvivagum* Jord.), leaf (mostly along midrib) dorsally often more or less stellate-hairy; cauline leaves (0–)1(–2) (coefficient of leafiness 0.03), ovate-oblong, petiolate, with cordate or truncate base, often coarsely toothed (particularly at base), sometimes quite large, in lower third of stem, to densely pubescent, leaf somewhat stellate-hairy beneath. Inflorescence corymbose (candelabrum-like), with 10(3–36) capitula; peduncles glabrous, moderately to densely glandular, glands 0.5(0.4–1.0) mm long, more or less densely tomentose. Involucres 9(–8)8.5–10.5(–11) mm long, cylindrical-ovate; involucre bracts linear, narrow, acute, glabrous, densely, 85(55–130), glandular, glands 0.8(0.5–1.2) mm long, stellate-hairy usually only along margin and at base, very rarely more or less densely stellate-hairy throughout (var. *stellatum* Juxip). Stigmas dark. Achenes 3.5 mm long. Flowering May to August (second flowering often in September to October). (Plate XXXI, Fig. 1.)

Forest edges, among shrubs and around rocks on mountains, mountain pastures, meadows overgrown with scrub forest, parks.—*European Part*: Baltic Region (south), Ladoga-Ilmen (south), Upper 334 Volga (up to Moscow), Upper Dnieper, Upper Dniester, Bessarabia? Crimea?; *Caucasus*: Dagestan, Eastern and Western Transcaucasia. *General distribution*: Central Europe, Mediterranean Region, Balkans-Asia Minor. Described from France. Type in Lyons.

Note. *H. gentile* Jord. is a species with an extremely wide distribution: from the Pyrenees to Moscow and from Denmark to Asia Minor; in our country, this is the most frequently found species of subsection *Muroria* (*H. murorum* L., which usually is called *H. gentile* Jord.) in our own floras. Furthermore, var. *silvivagum* Jord., apparently its shade form, is the form most commonly found. In the northern and eastern parts of its range, this variety is found almost exclusively.

Regarding var. *stellatum* Juxip, remarkable for its variegated involucre bracts from dense stellate hairs, it is found exclusively in Crimea and the Caucasus and perhaps should be raised to a higher taxonomic rank.

Speaking about the distribution of *H. gentile* Jord., Zahn (Pflzr. l. c.) writes: "Durch ganz Mitteleuropa bis Moskau und in den Distrikt Peczorai!" Moreover, in the very abundant material of this species collected from the Soviet Union (more than 60 herbarium sheets), there was not a single specimen collected north or east of the Peterhof—Moscow line.

From *H. exotericum* Jord., to which it is quite similar in habit, *H. gentile* Jord. is distinguished mainly by the dark color of the stigmas (stigmas yellow in *H. exotericum* Jord.).

A highly polymorphic species, particularly variable in pubescence.

386. **H. lepestoides** K. Joh. ex Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II (1893) 92; Norrl. in Mela-Cajander, Suom. Kasvio, 692; Zahn in Pflzr. IV, 280, 298; Dahlst. in Lindm. Svensk Fan.-Fl. 2 ed. 619; Joh. and Sam. Dalarn. Hier. Silvaticif. 39; Asch. and Graebn. Synopsis, XII, II, 386; Samuelsson, Maps of Scand. Hier. sp. No. 43.—Exs.: Norrl. Hier. exs. fasc. V, Nos. 79–84; Dahlst. Hier. Scand. cent. I, No. 44, III, No. 52, XI, No. 30; Baenitz. No. 6333; Lindberg, Pl. Finl. exs. No. 1694.

Perennial. Stem 40–60 cm high, 2–3 mm in diameter, dark red at base and scatteredly pubescent, without simple hairs above, but to sparsely glandular and stellate-hairy. Basal leaves 3–8, outer small, rotund-elliptical or ovate, with truncate base or abruptly narrowed to short petiole, subobtus, inner larger, to 16 cm long, broadly ovate-lanceolate (5:1), cuneately tapered to long petiole or with truncate base, short-acuminate, with 5–8 triangular-serrate, small and large sharp teeth, dark or light green, paler beneath, glaucescent, more or less glabrous above, to densely pubescent beneath and along margin, hairs 1.0–1.5 mm long, along midrib beneath and along violet petiole to densely pubescent, hairs 1.5–2.5 mm long, as a whole densely pubescent; cauline leaves (0)1(–2) (coefficient of leafiness 0.03), in middle of stem, narrowly ovate-lanceolate to lanceolate, bottom leaf petiolate, 335 distinctly and unequally sharp-toothed (teeth triangular, lanceolate, falcate, acute) upper leaf linear, sessile, moderately pubescent, stellate-hairy beneath. Inflorescence openly paniculate-corymbose, with 6–17 capitula; peduncles without simple hairs, moderately glandular, glands 0.3–0.6 mm long, slightly tomentose. Involucres 10.0–11.5 mm long, ovate; involucre bracts narrow, lanceolate-linear, subacute, without simple hairs, densely, 90(80–100), glandular, glands 0.6–0.8 mm long, more or less without stellate hairs (or with sparse hairs along margin), barbate. Stigmas yellow. Flowering June to August.

Edges of pine and larch forests.—*European Part*: Karelia-Lapland, Dvina-Pechora (western part), Ladoga-Ilmen (northern part). *General distribution*: Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type in Stockholm.

Note. It is a highly polymorphic species in which both the pubescence, simple and stellate, and the general habit (form of leaves) of the plant vary. In the original diagnosis, Dahlstedt (l. c.) gives the length of the involucre as 9–10 mm, apparently considering this to be an important character. But Norrlin (op. cit.) gives their length as 11–13 mm, while the involucres measured by us were 10.0–11.5 mm long.

In his work (l. c.) Norrlin gives the distribution of *H. lepidoides* K. Joh. as almost throughout Finland and says that “a variety(?) reaches the southern part of Russian Lapland,” but in the Lindberg’s Herbarium (under No. 1694) the statement is made: “... distributed almost throughout the whole area.” On the basis of these statements, this species got included on Samuelsson’s (l. c.) map, where it is shown at the eastern end of the Kola Peninsula, in Karelia, and at the mouth of the Severnaya Dvina River. Without questioning the authenticity of this statement, we, however, consider it necessary to mention that a number of specimens collected by R. Pohle on the Kola Peninsula and identified by Zahn as *H. lepidoides* were found to be other species (*H. microplacrum* Norrl., *H. frigidellum* Pohle and Zahn, *H. distractum* Norrl.). We are giving the description of this species because of the strong possibility of finding it within our borders in the Karelian-Lapland Region; E.G. Pobedimova collected this species on the shore of Kola Bay in the summer of 1956.

387. ***H. lateriflorum*** Norrl. Herb. Mus. Fenn. Hier. ed. 2 (1889) 152; in Mela-Cajander, Suom. Kasvio, 691; Zahn in Pflzr. IV, 280, 297, non Arv.-Touv. (1913).—**Exs.**: Norrl. Hier. exs. fasc. V, No. 89, IX, No. 65.

Perennial. Stem 30–65 cm high, 1.5–3.5 mm in diameter, with occasional hairs, with occasional glands above. Basal leaves 4–7, ovate to lanceolate, to 20 cm long (4.5:1), with truncate base and fairly long, winged petiole, subobtusely or short-acuminate with 3–10 small, broadly triangular teeth, more conspicuous at base, dark green, on both sides with sparse hairs 0.5–0.7 mm long, densely pubescent along margin and along midrib beneath with hairs 1.5 mm long, as a whole to moderately pubescent; cauline leaves 1(–2) (coefficient of leafiness 336 0.02), more or less narrowly lanceolate (7.5:1), long-petiolate, in lower part distinctly sharp-toothed, long-acuminate, entire, stellate-hairy beneath. Inflorescence paniculate-corymbose with 2–10 capitula; peduncles without simple hairs, moderately glandular, glands 1 mm long, weakly tomentose. Involucres 9.5–11.0 mm long; involucral bracts

blackish-green, linear, subacute, glabrous, to densely, 75(65–85), glandular, glands 1 mm long, more or less without stellate hairs. Stigmas dark. Achenes 3.5 mm long, black. Flowering July.

Mixed spruce-birch forests.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia (Finland). Endemic. Described from Finland. Type in Helsinki; paratype in Leningrad.

Note. According to Norrlin (op. cit.), it is found only in southwestern Finland. However, Zahn identified several specimens collected by R. Pohle from the Kola Peninsula as *H. lateriflorum* Norrl., which upon examination were found to belong to other species (*H. distractum* Norrl., *H. microplacerum* Norrl., and *H. ovatifrons* Dahlst.). Nevertheless, we include this species because there is a possibility of finding it in Karelian Lapland, Ladoga-Ilmen Region, because we have seen that the plant collected in 1932 from the Khibiny Mountains (Petrelius Valley) was very similar to *H. latiflorum* Norrl. and at least for the time being (until confirmed data are available) we are leaving the plant under this name.

Cycle 22. Torticepsia Juxip.—Involucral bracts and peduncles densely glandular, quite densely stellate-hairy.

388. **H. torticeps** Dahlst. Bidr. Sydöstr. Svensk. Hier.-Fl. II (1893) 128; Zahn in Pflzr. IV, 280, 309; Asch. and Graebn. Synopsis, XII, II, 431.—**Exs.**: GRF No. 1838; Dahlst. Hier. exs. I, No. 56, II, No. 41; Hier. Scand. cent. V, No. 32.

Perennial. Stem 30–70 cm high, 2–3 mm in diameter, sulcate, sparsely short-pubescent, sparsely to scatteredly glandular and stellate-hairy above. Basal leaves 3–7, elongated, to 25 cm long, narrow (5–6:1), lanceolate or ovate-lanceolate, with truncate base, at least inner leaves but sometimes majority of them narrowed to long petiole, with many narrow, sharply serrate teeth, at base narrowly and sharply incised, and with free teeth along petiole, obtuse to short-acuminate, light grass-green, grayish beneath, on both sides and along margin sparsely to moderately pubescent, hairs 0.5–1.0 mm long, very densely pubescent along midrib beneath with hairs 1.5 mm long, as a whole densely pubescent; cauline leaves 1(2–3) (coefficient of leafiness 0.02), in middle of stem, lanceolate, petiolate, acute, with sharply serrate teeth, glabrous above, like basal leaves in other characters stellate-hairy beneath, upper leaves sessile, small. Inflorescence paniculate-corymbose, with 5–15 capitula; peduncles without simple hairs, to densely glandular, glands 0.5 mm long, tomentose. Involucres 9–11 mm long, turbinate; involucral bracts narrow, subacute, dark green, barbate, without simple hairs, to densely, 75(70–100), glandular, glands 0.5–0.7(1.2) mm

long, quite dense, particularly along margin, stellate-hairy (on back sparse). Stigmas yellow, later turning dark. Flowering June to July.

On slopes in scrubs, deciduous forests.—*European Part*: Baltic Region (southern part), Upper Dnieper? *General distribution*: Scandinavia, Central Europe. Described from Sweden. Type in Stockholm.

Cycle 23. Revocata Juxip.—Involucral bracts and peduncles densely glandular, more or less without stellate hairs.

389. **H. altipes** Lbg. fil. ex Norrl. Hier. exs.: Zahn in Pflzr. IV, 280 (1921) 301.—*Exs.*: Norrl. Hier. exs. fasc. IX, No. 59.

Perennial. Stem 45–50 cm high, 1.5–2.0 mm in diameter, violet at base, to sparsely pubescent, to sparsely glandular above. Basal leaves 4, ovate, elliptical to lanceolate, mostly abruptly narrowed to long petiole or base of lamina truncate, with short or (to 10 mm long) long teeth, teeth 3–10, obtuse to short-acuminate, light green, pale beneath, violet to 14 cm long (3.8:1), glabrous above (or with occasional hairs), with scattered pubescence beneath and along margin, with hairs 0.5–0.7 mm long, to dense pubescence along midrib beneath, as a whole to moderately pubescent; cauline leaves 1–2 (coefficient of leafiness 0.03), bottom leaf lanceolate, petiolate, acute, with distinct, acute or short teeth, upper leaf linear, acute, entire. Inflorescence dichotomously paniculate, with 2–3 capitula; peduncles without simple hairs, densely glandular, glands 0.6 mm long, scattered-tomentose. Involucres 11 mm long; involucral bracts narrow, acute, dark green, with broad green border, glabrous, but to densely (70) glandular, glands 0.5–1.0 mm long, without stellate hairs. Stigmas dark. Flowering June to July.

On slopes overgrown with hazelnut, spruce forests.—*European Part*: Ladoga-Ilmen. *General distribution*: Scandinavia (Finland). Described from Finland, Åland Islands. Type in Helsinki.

390. **H. revocans** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 515.

Perennial. Stem 55–60 cm high, 2.5 mm in diameter, sulcate, violet at base, often with lateral stems, with occasional hairs, with occasional glands above. Basal leaves 8(4–13), cordate-rounded, oval to broadly lanceolate, to 20 cm long (4:1), often asymmetric, with truncate base or abruptly narrowed to long petiole, subobtuse, short-acuminate with spinescent tip, with quite unequal, crenate and (at base) lobed, acute
338 teeth, small and large teeth alternating, grass-green, glaucescent

beneath, moderately pubescent above, hairs 0.3 mm long, with scattered pubescence beneath and along margin, hairs 0.7 mm long, densely pubescent beneath along midrib, hairs 0.8 mm long, as a whole to densely pubescent; cauline leaves 1–2 (coefficient of leafiness 0.02), lanceolate, bottom leaf large, petiolate, at base very densely toothed with lobed acute teeth, acuminate, to moderately pubescent, upper leaf narrowly lanceolate, sessile stellate-hairy beneath. Inflorescence corymbose-umbellate, with 3–17 capitula; peduncles without simple hairs, densely glandular, glands 0.4 mm long, tomentose. Involucres 10 mm long; involucre bracts narrow, subobtusate, glabrous, densely, 78(60–90), glandular, glands 0.4–0.5 mm long, slightly stellate-hairy along margin. Stigmas dark. Flowering July to August.

Spruce-birch forests.—*European Part*: Karelia-Lapland. Endemic. Described from Khibiny Mountains. Type in Kirovsk.

Note. It is distinguished from *H. lateriflorum* Norrl. by the densely glandular peduncles, subobtusate involucre bracts, and densely pubescent leaves.

391. ***H. tenuiglandulosum*** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 693; Zahn in Pflzr. IV, 280, 299 (nota).—*H. semilyratum* Norrl. in Mela-Cajander, Suom. Kasvio, 693; Zahn in Pflzr. IV, 380, 299 (nota).—**Exs.:** Norrl. Hier. exs. fasc. V, No. 78.

Perennial. Stem 35–55 cm high, 2–3 mm in diameter, sparsely pubescent at base, but with scattered (to dense) glands from middle of stem to inflorescence. Basal leaves 3–8, outer small, cordate or lanceolate, inner larger, lanceolate, to 16 cm long (4:1), with base abruptly or gradually attenuated to more or less long petiole, obtuse to subacute, entire (very rarely with occasional fine, scarcely conspicuous teeth near base), very densely short-pubescent throughout, hairs 0.5–1.0 mm long (unlike any other species of subsection *Muroria*), somewhat stellate-hairy beneath, light olive-green, glaucous or violet beneath; cauline leaves 1–2(–3) (coefficient of leafiness 0.03), lanceolate, small, sessile or with short petiole, acute, entire, more or less densely stellate-hairy beneath. Inflorescence paniculate-corymbose, with 6–22 capitula; peduncles without simple hairs, very densely glandular, glands 0.5–1.5 mm long, scattered-tomentose. Involucres 8.5–10.0(–11.0) mm long, involucre bracts narrow, linear, acute, without simple hairs, densely, 96(88–106), fine-glandular, glands 0.7–1.5 mm long, weakly stellate-hairy along margin. Stigmas yellow, later turning dark. Flowering June to July.

Pine forests, meadows overgrown with shrubs, along rocks.—*European Part*: Karelia-Lapland, Ladoga-Ilmen (northern part).

General distribution: Scandinavia (Finland). Endemic. Described from Finland. Type in Helsinki.

Note. We consider *H. semilyratum* Norrl. a synonym of *H. tenuiglandulosum* Norrl. because the two species are almost identical.

- 339 The character differentiating these species, which in fact is only in a higher density of leaf pubescence in *H. semilyratum*, in our opinion is insufficient for splitting off a separate species, especially when we consider the extremely abundant pubescence of both species.

Cycle 24. *Serratifolia* Juxip.—Involucral bracts very densely glandular.

392. ***H. kolicola* Juxip nom. nov.**—*H. murmanicola* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 515, non Zahn.

Perennial. Stem 35 cm high, 2 mm in diameter, sparsely pubescent below with hairs 1.5 mm long, glandular above. Basal leaves 3, ovate to lanceolate, small, abruptly to more or less gradually narrowed to short, winged petiole, short-acuminate, serrulately or spinosely toothed (teeth with blackish-violet tips), grass-green, densely pubescent above and along margin with hairs 0.9–1.0 mm long, very densely so along midrib beneath with hairs 1.2–2.0 mm long, as a whole very densely pubescent (in this respect resembling *H. sagittatum* Lindeb.); cauline leaves 2 (coefficient of leafiness 0.06), lanceolate, acute, toothed, bottom leaf short-petiolate, upper sessile. Inflorescence corymbose, with 4 capitula; peduncles glabrous, scatteredly glandular, weakly tomentose. Involucres 12 mm long; involucral bracts broad, subobtusate, glabrous, very densely (110) glandular, glands 0.5–0.7 mm long, more or less without stellate hairs. Flowering July. (Plate XXXII, Fig. 1.)

Tundra.—**Arctic:** Arctic Europe. Endemic. Described from Ekaterina Island (Murmansk Region). Type in Leningrad.

Note. Close to *H. serratifolium* Jord., from which it is distinguished by very densely pubescent leaves.

393. ***H. serratifolium* Jord.** ex Bor. Fl. Centr. France, ed. 3, II (1857) 417, nec Vukot.; Zahn in Pflzr. IV, 280, 295; Asch. and Graebn. Synopsis, XII, II, 377.—*H. serratifrons* Almqu. ex Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II (1893) 89; Norrl. in Mela-Cajander, Suom. Kasvio, 691; Dahlst. in Lindm. Svensk Fan.-Fl. 2, ed. 617.—*H. silvaticum* ssp. 11 *pellucidum* var. 1 Almqu. Stud. (1881) p. XX.—*H. crispulum* Dahlst. Hier. exs. fasc. I, No. 61.—**Exs.:** Dahlst. Hier. Scand. cent. III, No. 50, XIX, Nos. 43, 44; Norrl. Hier. exs. fasc. VII, No. 73, IX, Nos. 62, 63; Lindb. f. Pl. Finl. exs. No. 1686.

Perennial. Stem 40–70 cm high, 1.5–2.0 mm in diameter, sulcate, violet at base, to sparsely pubescent, with occasional glands and stellate hairs above. Basal leaves 4–9, rounded-elliptical, ovate to broadly lanceolate (3.2:1), with truncate base or cuneately narrowed to base, long-petiolate, subobtusely, retuse to short-acuminate, serrulate
 340 with many (5–9) teeth, dark green or grass-green, silvery-glaucous beneath, more or less glabrous above (however, lower leaves with occasional hairs), densely pubescent beneath and along margin with hairs 1.5–1.0 mm long, very densely so along midrib beneath and on petiole, hairs 2.5–3.0 mm long, as a whole densely pubescent (petioles lanate); cauline leaves (0–)1(–2) (coefficient of leafiness 0.02), resembling inner basal leaves, but narrower (5.5:1), upper leaf linear-lanceolate, sessile, as a whole moderately pubescent, stellate-hairy beneath. Inflorescence corymbose, with 4–6(12) capitula; peduncles without simple hairs, scattered-glandular, glands 0.6–1.0 mm long, tomentose. Involucres 10–12 mm long, cylindrical-ovate; involucre bracts more or less broad, to 2 mm, linear, subobtusely, blackish-green, barbate, glabrous, very densely, 105(100–110), glandular, glands 1.0–1.2 mm long, without stellate hairs. Florets sometimes tubular; stigmas dull-yellow or dark (turning dark). Flowering June to July.

Open birch forests, edges of spruce forests with hazelnut undergrowth, on calcareous soil.—*European Part*: Baltic Region (southern part), Upper Dnieper, Upper Dniester. *General distribution*: Scandinavia (south), Central Europe, Mediterranean, Balkans-Asia Minor (western part). Described from France. Type in Lyons.

394. **H. grandidens** Dahlst. Bidr. Sydöstr. Sverig, Hier.-Fl. II (1893) 129, non Elfstr.; Zahn in Pflzr. IV, 280, 314; Asch. and Graebn. Synopsis, XII, II, 447.—*H. setaceodentatum* Rahm. Wol. Fl. Polon. exs. (1893) No. 198, p. p.—*H. macrodon* Sudre in Bull. Assoc. pyren. (1899) 248; Hier. Fl. Centr. France, 72, t. XXII, nec N.P.—*Exs.*: Dahlst. Hier. exs. fasc. I, Nos. 54, 55; Hier. Scand. cent. XX, No. 99; Zahn, Hier. Europ. Nos. 352, 735.

Perennial. Stem 45–60 cm high, 2–3 mm in diameter, pubescence scattered below with hairs 2 mm long, scattered-glandular above, somewhat stellate-hairy. Basal leaves 5(3–6), broadly cordate-ovate, rotund-obtusely to ovate-oblong, with cordate or truncate base, acute, mostly large, to 23 cm long (3–4:1), coarsely and unequally sharp-toothed throughout, at base large, elongated or recurved deeply cut teeth, leaves dark green, scattered-pubescent above with hairs 0.5–1.0 mm long, to densely pubescent beneath, hairs 1.5–2.0 mm long, pubescence along margin moderate, very dense along midrib beneath, hairs 2 mm long, as a whole very densely (particularly on petioles)

pubescent; cauline leaves 1(–2)) (coefficient of leafiness 0.03), ovate-lanceolate to triangular-lanceolate, with deeply incised teeth, acute. Inflorescence corymbose, with 4–20 capitula; peduncles without simple hairs; densely glandular, glands 0.6 mm long, tomentose. Involucres 8.5–10.5 mm long; involucral bracts linear-lanceolate, acute, without simple hairs, very densely, 110(70–145), fine-glandular, glands 1 mm long, barbate, weakly stellate-hairy along margin. Stigmas dark. Flowering June to July (second flowering September to October).

- 341 Spruce and larch forests.—*European Part*: Upper Dnieper, Upper Dniester. *General distribution*: Scandinavia, Central Europe, Mediterranean Region, Balkans-Asia Minor (western part). Described from Sweden. Type in Stockholm.

395. **H. silvularum** Jord. ex Bor. Fl. Centr. France, ed. 3, II (1857) 418; Zahn in Pflzr. IV, 280, 314; Asch. and Graebn. Synopsis, XII, II, 449.—*H. macrodon* δ . *silvularum* Sudre, Hier. Centr. France (1902) 73, t. XXII.— *Ic.*: Zahn in Pflzr. (l. c.) 311, fig. 28, D; van Soest. Hier. Nederl. I, fig. 4, 13.— *Exs.*: Zahn, Hier. Europe, Nos. 559a, 735a; Hayek, Fl. Stir. exs. Nos. 497, 498; Petrak, No. 592.

Perennial. Stem 30–60 cm high. Basal leaves oblong-ovate, small to very long, elongated, but in general broad (3:1), base cordate, petiole shorter than lamina, unequally and coarsely serrate with many broadly triangular teeth, 1–2 pairs of teeth at base, recurved, large, leaves glabrous above, or (more rarely) short-pubescent, very densely pubescent beneath and along margin, petioles lanate-pilose; cauline leaves 1 (coefficient of leafiness 0.02), ovate-lanceolate, broad or narrow, often with deep (lobed) teeth at base, acute, short-petiolate, stellate-hairy beneath. Inflorescence paniculate, with few capitula. Involucres 9–11 mm long, involucral bracts somewhat broad to narrow, acute, glabrous, very densely glandular, with large glands, with scarcely visible stellate hairs along margin. Stigmas dark. Flowering June to July.

Forest edges and forest clearings, in mountains to 2000 m.—*European Part*: Upper Dnieper, Upper Dniester; *Caucasus*: Eastern Transcaucasia. *General distribution*: Central Europe, Mediterranean Region, Balkans-Asia Minor, Armenia-Kurdistan, Iran. Described from France. Type in Lyons.

Note. This description is based on a very incomplete diagnosis; we were not able to see the type specimens. Apparently it can be distinguished from *H. grandidens* Dahlst. only with difficulty.

396. **H. lyratum** Norrl. in Herb. Mus. Fenn. ed. 2 (1889) 152; in Mela-Cajander, Suom. Kasvio, 693; Brenn. Finl. Hier. form. IV, 22; Zahn in Pflzr. IV, 280, 297; Joh. and Sam. Dalarn. Hier. Silvaticif. 41; Asch. and Graebn. Synopsis, XII, II, No. 46.— *Exs.*: GRF No. 2086; Norrl. Hier.

exs. fasc. V, Nos. 74–77, IX, No. 67; Joh. and Sam. Hier. exs. Nos. 30–40.

342 Perennial. Stem 40–80 cm high, 1–4 mm in diameter, sulcate, with occasional hairs, scattered-glandular and somewhat stellate-hairy above (from middle of stem). Basal leaves 5(3–8), outer small, elliptical or ovate, with truncate or obtuse base, short-petiolate, obtuse (usually more densely pubescent than inner leaves), inner leaves larger (to 22 cm long), oblong-obovate or lanceolate, often with elongated and then abruptly truncate base, long-petiolate (4.5:1), toothed in lower part, toward base lyrate-toothed, with free teeth on petiole, more or less entire toward tip, subobtuse to short-acuminate, bright grass-green, silvery-glaucous beneath and often violet, (almost) glabrous above (in typical form) or with scattered hairs 0.5 mm long—f. *lyratoides* Juxip, very dense hairs 0.5–0.7 mm long, beneath, moderately pubescent along margin with hairs 0.5–1.0 mm long very dense hairs along midrib beneath 1.0–1.5 mm long, as a whole densely pubescent, leaves somewhat (along veins) stellate-hairy; cauline leaves (1–)2(–3) (coefficient of leafiness 0.03), more or less lanceolate, bottom leaf often large (to 19 cm long) (4:1), unequally toothed, short-petiolate, upper sessile, pubescence as in basal leaves, stellate-hairy beneath. Inflorescence spreading paniculate-corymbose, with long upward-turned branches, with 4–22 capitula; peduncles glabrous, densely glandular, glands 0.6–1.2 mm long, weakly tomentose. Involucres 10–11(–12) mm long, cylindrical-ovate; involucre bracts narrow, subobtuse or acute, somewhat dark, glabrous, very densely, 100(95–125), glandular, glands 0.6–1.3 mm long, more or less without stellate hairs. Stigmas dark. Flowering June to July.

Mostly in pine forests and meadows overgrown with shrubs; prefers sandy soil or stony (silicate) rocks.—*European Part*: Karelia-Lapland (southern part), Ladoga-Ilmen, Baltic Region (Estonian SSR, in central and eastern part). *General distribution*: Scandinavia, Central Europe (Pomerania). Described from Finland. Type in Helsinki; paratype in Leningrad.

Note. Along with the typical form, occasionally one also finds f. *lyratoides* Juxip, which is distinguished by conspicuous pubescence on the upper surface of the leaves. It is interesting that in the Baltic Region (Estonian SSR) hitherto only the pubescent form was found.

Its leaves often are infected with the fungus *Puccinia hieracii* (Schum.) Mart.

Subsection 6. *Caesia* Juxip.—Zahn in Pflzr. IV, 280 (1929) 436 (ut. sp. coll.); Asch. and Graebn. Synopsis, XII, II (1931–1935) 362, 675 (ut. sp. coll.).—Characters in key. Coefficient of leafiness 0.05(0.03–0.09),

i.e., cauline leaves 1 to 5; involucre bracts distinctly pubescent with hairs in different combinations with glands (from 90:10 to 50:50); glands small, 0.2–0.4(0.5) mm long; pollen almost always absent.

Members of this subsection are found in Central and Northern Europe, owing to the presence of lime in the soil (and, apparently, also a milder climate); in the USSR, they are concentrated almost exclusively in the northwestern part of the European Territory of the Soviet Union.

- 343 1. Hairs and glands occur on involucre bracts more or less in equal numbers (or glands even exceed hairs); plants linking subsection *Caesia* with subsection *Laevicaulia*, *Vulgata* or *Muroria*; in other words, not typical representatives of subsection *Caesia*.....2.
- + Hairs on involucre bracts many more than glands; stigmas dark (typical representatives of subsection *Caesia*).....8.
2. Number of glands on involucre bracts considerably exceeding number of hairs; stellate hairs on involucre bracts very dense; coefficient of leafiness 0.04, i.e., cauline leaves on average 2; pubescence of leaves to moderate; stigmas dark.....397. *H. caesiomurorum* Lindeb.
- + Glands and hairs on involucre bracts more or less equal in number.....3.
3. Coefficient of leafiness 0.07, i.e., cauline leaves relatively many (4); leaves more or less glabrous (without hairs), narrowly lanceolate, light green; basal leaves mostly withering before anthesis; stem at base distinctly white-pubescent; in habit, plants resembling *H. vulgatum*; plants of Baltic Region.....398. *H. albipes* Dahlst.
- + Coefficient of leafiness medium to low (0.06–0.02).....4.
4. Coefficient of leafiness medium (0.06–0.05); basal leaves at anthesis more or less many (in rosette); leaves (dark) glaucous.....5.
- + Coefficient of leafiness low (0.04–0.02).....7.
5. Pubescence of leaves moderate; leaves spotted, broad, many, acutely and deeply (subulately) toothed; stigmas dark.....399. *H. basifolium* (Fr.) Almqu.
- + Pubescence of leaves sparse (to barely scattered); leaves never spotted.....6.
6. Leaves narrow (6:1); involucre bracts narrow, acute with sparse, fine glands (0.2–0.4 mm long); stigmas yellowish-brown.....400. *H. prolixiforme* Norrl.

- + Leaves broad (3:1); involucre bracts broad, abruptly narrowed to cusp, with occasional glands 0.5 mm long; stigmas dark; plants of Baltic Region.....401. **H. aphanum** Juxip
- 7 (4). Involucre bracts with moderate number (50) of short (0.1–0.3 mm-long) glands; involucre 12–13 mm long; corollas saffron-yellow; basal leaves few; plants of Kola Peninsula.....403. **H. linahamariense** Juxip
- + Involucre bracts with occasional (10) glands 0.3 mm long; involucre 10–12 mm long; corollas dark yellow; basal leaves many (in rosette).....402. **H. subgalbanum** Juxip
- 8 (1). Coefficient of leafiness high (0.09), i.e., cauline leaves relatively many (5); involucre 9 mm long; involucre bracts densely stellate-hairy; leaves broad (3.5:1).....404. **H. adelum** Juxip
- + Coefficient of leafiness low (0.04–0.02).....9.
- 344 9. Pubescence of leaves moderate.....10.
- + Pubescence of leaves scattered.....11.
- 10. Leaves with 4–5 broad and short teeth, teeth mostly triangular; leaves olive-green; stigmas greenish.....405. **H. osiliae** Dahlst.
- + Leaves with 8–15 teeth, teeth various: triangular, lanceolate, falcate, mostly narrow and acute; leaves grass-green; stigmas dark.....406. **H. steinbergianum** Juxip
- 11. Leaves light (grass) green; involucre bracts of three shapes: outer short, very obtuse, middle longer, subobtuse, inner long, acute.....407. **H. galbanum** Dahlst.
- + Leaves glaucous; involucre bracts all acute to very acute, subulate (inner ones).....12.
- 12. Involucre bracts more or less without stellate hairs.....408. **H. caesium** Fr.
- + Involucre bracts densely stellate-hairy.....409. **H. ravusculum** Dahlst.

Cycle 1. Caesiomuroria Juxip.—*Grex H. caesiomurorum* Lindb. ex Norrl. Bidr. Scand. Hier.-Fl. I (1888) 113; Dahlst.—Bidr. Sydöstr. Sverig. Hier.-Fl. III, 44; Zahn in Pflzr., IV, 280, 451.—Glands on involucre bracts considerably more than hairs (80:20); involucre bracts somewhat broad, lanceolate or triangular-lanceolate, with broad, densely stellate-hairy border; leaves ovate or lanceolate, deeply sharp-toothed; cauline leaves 1–3; stigmas dark. It links section *Caesia* with *Muroria*.

397. **H. caesiomurorum** Lindeb. ex Norrl. Bidr. Skand. Hier.-Fl. I (1888) 113; Stenstr. Värml. Arch. 35; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III, 44; Norrl. in Mela-Cajander, Suom. Kasvio, 712; Zahn in Pflzr. IV, 280, 451; Joh. and Sam. Dalarn. Hier. Vulgatif. 14; Dahlst. in



Lindm. Svensk. Fan.-Fl. 2 ed. 620; Samuelsson, Maps of Scand. Hier. sp. No. 75.—*H. eu-caesium* Zahn in Asch. and Graebn. Synopsis, XII, II (1935) 692.—**lc.**: Zahn in Pflzr. (op. c.) 452, fig. 32.—**Exs.**: Lindeb. Hier. Scand. cent. II (1872) No. 59; Norrl. Hier. exs. fasc. IX, Nos. 88–90; Dahlst. Hier. exs. fasc. I, Nos. 64–66; Herb. Hier. Scand. cent. II, Nos. 46, 47; Lindb. f. Pl. Finl. exs. No. 1726.

347 Perennial. Stem 35–75 cm high, 2–4 mm in diameter, with occasional to sparse hairs 2.5 mm long (in lower part), with occasional glands above. Basal leaves 2–9, outer small, elliptical or ovate, obtuse (often withering before anthesis), others more or less broadly ovate to lanceolate, quite large, to 17 cm long (4.5:1), with base cuneate or abruptly narrowed to long petiole, with long, acute teeth, dissectedly lobed at base, acute to acuminate, dark glaucous, paler beneath, glabrous above or with occasional hairs 0.5 mm long, pubescence to scattered beneath, hairs 1 mm long, moderately pubescent along margin, hairs 1 mm long, to densely so along midrib beneath and on petiole, hairs 1.5 mm long, as a whole to moderately pubescent, leaves somewhat stellate-hairy beneath; cauline leaves 2(1–3) (coefficient of leafiness 0.04), ovate-lanceolate to more or less triangular, abruptly narrowed to petiole, with long, acute teeth, particularly at base, long-acuminate, stellate-hairy beneath, upper leaf linear, entire, acute. Inflorescence paniculate, with 9–13 capitula; peduncles glabrous or with occasional hairs, with scattered glands 0.3 mm long, tomentose. Involucres 9–10(–12) mm long, truncate; involucre bracts somewhat broad, triangular-lanceolate, subobtusate, barbate, with occasional to sparse, 13(8–18), hairs 1 mm long and scattered to moderate, 44(34–53), glands 0.3–0.5 mm long, very densely stellate-hairy along margin (forming a broad border). Stigmas dark. Flowering July to August.

Forest edges.—*European Part*: Ladoga-Ilmen (northern part). *General distribution*: Scandinavia, Atlantic Europe. Described from Sweden. Type in Helsinki.

Cycle 2. Albipedia Juxip.—Hairs and glands on involucre bracts more or less equal; coefficient of leafiness 0.07, i.e., cauline leaves 4.

398. **H. albipes** Dahlst. Beitr. Hier.-Fl. Oesels (1901) 39; Zahn in Pflzr. IV, 280, 445; Asch. and Graebn. Synopsis, XII, II, 686.—**lc.**: Dahlst. (l. c.) tab. VI., fig. 1.

Perennial. Stem 60 cm high, 2 mm in diameter, with scattered white hairs 3.5 mm long at base, glabrous above, eglandular. Basal leaves 0–4, outer (but often even all) withering before anthesis, narrowly lanceolate, narrowed to long petiole, to 25 cm long, with remote, unequal teeth; cauline leaves 4 (coefficient of leafiness 0.07), lower ones

narrowed to long, others to short petiole, upper leaf sessile, narrowly lanceolate (6.5:1), with irregularly scattered, unequal, broad, acute to uncinat teeth, at base teeth large, above shorter, with free teeth on petiole, upper leaf entire, acute, generally obtuse to acuminate at tip, light green, pale beneath, almost glabrous (without simple hairs). Inflorescence dichotomously paniculate, with 6–10 capitula; peduncles without simple hairs and glands, tomentose. Involucres 12–13 mm long, ovate; involuclral bracts lanceolate, acute, sparsely (17) pubescent with dark hairs 1 mm long, having light-colored cusp, sparsely (16) glandular, glands 0.6 mm long, sparsely stellate-hairy along margin and at base. Stigmas yellow. Flowering July

348 Forested slopes of moraines.—*European Part*: Baltic Region (Estnoian SSR). Endemic. Described from Saaremaa (Oesel) Island. Type in Stockholm.

Note. In habit, it resembles *H. vulgatum* Fr. The report of this species by K. Shoteberg and T. Westergren is still the only record.

Cycle 3. Prolixiformia Juxip.—Glands and hairs on involuclral bracts more or less equal; glands occasional to sparse; coefficient of leafiness 0.06–0.02.

399. **H. basifolium** (Fr.) Almqu. apud Stenstr. Värml. Arch. (1889) 43; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III, 38; Norrl. in Mela-Cajander, Suom. Kasvio, 721; Zahn in Pflzr. IV, 280, 445; Joh. and Sam. Dalarn. Hier. Vulgatif. 14; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 620; Asch and Graebn. Synopsis, XII, II, 689; Samuelsson, Maps of Scand. Hier. sp. No. 74.—*H. vulgatum basifolium* Almqu. Stud. (1881) p. XXIII.—**Exs.**: Fries, Herb. norm. fasc. II, No. 10; Lindeb. Hier. Scand. exs. No. 60 (sub. *H. caesio*); Dahlst. Hier. exs. I, Nos. 73–75; Herb. Hier. Scand. cent. II, Nos. 26, 27, III, No. 86; Lindeb. f. Pl. Finl. exs. No. 1742.

Perennial. Stem 45–70 cm high, 2–3 mm in diameter, sparsely (mainly at violet base) pubescent with hairs to 3 mm long, eglandular, above somewhat stellate-hairy. Basal leaves 2–9, outer rotund-ovate to oblong-ovate, obtuse, sparsely denticulate, inner leaves larger, to 16 cm long, elliptical, ovate to oblong-lanceolate (4:1), abruptly or more or less gradually narrowed to rather long petiole, long-acuminate, mostly with many (5–13), unequally long and short, acute teeth (teeth to subulate), with free teeth on petiole, dark glaucous, densely purple- or dark-spotted, paler beneath, silvery-glaucous, with occasional hairs 0.5 mm long above, scattered-pubescent beneath with hairs 0.8 mm long, hairs scattered along margin, 1 mm long, hairs dense along midrib beneath, 1.5 mm long, as a whole to moderately pubescent, petiole densely lanate; cauline leaves 1–4(–5) (coefficient of leafiness 0.06),

bottom leaf petiolate, ovate-lanceolate, with truncate base or more or less abruptly (cuneately) narrowed to petiole, with 6–8 long, acute teeth, long-acuminate, upper leaves small, sessile, entire, stellate-hairy beneath. Inflorescence paniculate with long branches and 4–11 capitula; peduncles long with occasional hairs 0.5 mm long, eglandular, tomentose. Involucres 9–11 mm long, ovate; involucre bracts narrow, linear, obtuse to acute, pubescence sparse to scattered, 22(16–40), hairs 1 mm long, glands 0.1–0.3 mm long, occasional to sparse 14(10–22), along margin sparsely stellate-hairy, with tufts. Stigmas dark. Flowering July.

Edges of open forests, on hills overgrown by forests.—*European Part*: Ladoga-Ilmen (northern part). *General distribution*: Scandinavia, Central Europe. Described from Sweden. Type in Stockholm.

- 349 400. **H. prolixiforme** Norrl. Herb. Mus. Fenn. ed. 2 (1889) 149; in Mela-Cajander, Suom. Kasvio, 721; Zahn in Pflzr. IV, 280, 448 (nota).—*Exs.*: Norrl. Hier. exsiccata fasciculus VIII, Nos. 60–64.

Perennial. Stem 25–55 cm high, 1–3 mm in diameter, sulcate, eglandular, often with lateral stems. Basal leaves 2–6, outer small, obovate or lanceolate, often withering before anthesis, inner larger, to 19 mm long, narrowly lanceolate, gradually narrowed to petiole (6:1), with 8–10, mostly small (alternating with larger) serrate teeth, acuminate, glaucous, glabrous above, with occasional to sparse hairs 0.5–1.0 mm long beneath and along margin, moderately pubescent along midrib beneath with hairs 1.5 mm long, as a whole sparsely pubescent, stellate-hairy beneath; cauline leaves 1–2(–3) (coefficient of leafiness 0.05), bottom leaf petiolate, toothed, acuminate, upper ones sessile, entire, acute. Inflorescence dichotomously paniculate, with 2–15 capitula; peduncles with occasional hairs 0.6–1.0 mm long and occasional glands 0.2–0.3 mm long, tomentose. Involucres 9–11 mm long; involucre bracts narrow, acute, blackish-green, with sparse, 15(10–20), hairs 1 mm long and sparse, 19(13–27), glands 0.2–0.4 mm long, somewhat stellate-hairy. Stigmas yellowish-brown to dark. Flowering July. (Plate XXVII, Fig. 1.)

Open places, edges of forests and meadows.—*European Part*: Karelia-Lapland, Dvina-Pechora (western part). *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki.

401. **H. aphanum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 516.

Perennial. Stem 55 cm high, 2.5 mm in diameter, with occasional hairs at base, eglandular. Basal leaves 7, rosulate, elliptical, rhomboid or broadly lanceolate, to 15 cm long (3:1), cuneately narrowed to short, winged petiole, with 4–7 acute, triangular, forward-directed teeth along

whole of margin, short-acuminate, dark green, with occasional hairs 1–2 mm long on both sides, scattered-pubescent along margin, along midrib densely pubescent, as a whole pubescence to scattered; cauline leaves 3 (coefficient of leafiness 0.06), broadly lanceolate, resembling inner basal leaves, upper leaf sessile, entire, acuminate. Inflorescence paniculate, with 12 capitula; peduncles without simple hairs and glands, tomentose. Involucres 10.5 mm long; involucral bracts broad, abruptly narrowed at tip, with occasional (15) hairs 1 mm long and occasional (10) glands 0.5 mm long, somewhat stellate-hairy (along margin). Stigmas dark (brownish). Flowering July.

Deciduous forest (in park).—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Rakvere (Estonian SSR). Type in Tartu. A very rare species.

350 **Note.** G. Samuelsson identified this plant as *M. caesiomurorum* Lbg., with which it in fact is identical in habit, differing, however, by having a small number of glands in the inflorescence (in *H. caesiomurorum* Lbg. peduncles and involucral bracts are densely glandular).

402. **H. subgalbanum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 516.—*H. variabile* f. *subgalbanum* Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III (1894) 27; Dahlst. Beitr. Hier.-Fl. Oesels, 37; pro var. *H. variabili*; Zahn in Pflzr. IV, 280, 443; Asch. and Graebn. Synopsis. XII, II, 683.—**lc.**: Dahlst. Beitr. Hier.-Fl. Oesels (l. c.) t. V, fig. 1.—**Exs.**: GRF No. 1812.

Perennial. Stem 30–65 cm high, 1.0–2.5 mm in diameter, glabrous or with occasional hairs, eglandular. Basal leaves 2–7, elliptical to lanceolate, abruptly or cuneately narrowed to petiole, short-acuminate, to 22 cm long (4.3:1), with 6–8 small, acute, unequal teeth along whole margin (sometimes with very deeply lobed, sparse, unequal teeth—f. *kypuense* Juxip), grass-green, glabrous above or with occasional hairs, hairs occasional beneath, with scattered hairs 1 mm long along margins, moderately pubescent along midrib, hairs 1.5 mm long, as a whole to scattered-pubescent; cauline leaves 1–2(–3) (coefficient of leafiness 0.03), narrowed to petiole, resembling inner basal leaves, acuminate. Inflorescence dichotomously paniculate, with 2–15 capitula; peduncles more or less glabrous and eglandular or to sparsely glandular, tomentose. Involucres 10–12 mm long; involucral bracts obtuse to acute, with occasional to scattered 15(10–20–36), hairs 1 mm long and with occasional, 10(7–16), glands 0.3 mm long, with scattered stellate hairs. Corollas dark-yellow. Stigmas yellow, later turning dark. Flowering June to July.

Edges of open forests on calcareous soil.—*European Part*: Karelia-Lapland, Baltic Region (Estonian SSR, western part). *General distribution*: Scandinavia. Described from Saaremaa Island. Type in Stockholm.

Note. This species is very similar to *H. galbanum* and difficult to distinguish from it. The distinguishing characters (long, narrow, and acute teeth, as in *H. galbanum* also) given by Dahlstedt are of no help in identification. Dahlstedt's statement ("involucris minoribus magis canis diversum"—also does not help in the distinguishing of the species, because this character is observed not only in *H. subgalbanum* but in *H. galbanum* as well. In our opinion, a good distinguishing character would be the ratio of the number of hairs to glands on the involucre bracts, which is 60:40 for *H. subgalbanum* Juxip, whereas for typical *H. galbanum* Dahlst. it is 80:20. In this context it is also necessary to note that *H. variable* Lönnr., to which *H. subgalbanum* was referred by Dahlstedt (as a form and variety), is distinguished by having a large number of cauline leaves, i.e., the coefficient of leafiness averages 0.09, whereas in *H. subgalbanum* it is 0.03 (as also in *H. galbanum* Dahlst.). From this point of view, referring *H. subgalbanum* to *H. variable* Lönnr. in general is without basis.

Cycle 4. Linahamarensia Juxip.—Glands and hairs more or less equal; glands in moderate number, 0.1–0.3 mm long; stigmas yellow.

403. **H. linahamariense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 517.

Perennial. Stem 40–45 cm high, 2.5 mm in diameter, violet at base, with occasional hairs (appears glabrous at first glance), with occasional glands above. Basal leaves 2–3, lanceolate, narrowed to petiole, and acuminate, scarcely denticulate, spotted, grass-green, reddish-violet beneath, to 15 cm long (4.5:1), glabrous above, with occasional hairs beneath and along margin, moderately pubescence along midrib beneath, with hairs to 2.5 mm long, as a whole pubescence to barely scattered; cauline leaves 1 (coefficient of leafiness 0.02), lanceolate, narrowed to short petiole, in lower 1/4 of stem. Inflorescence paniculate, secund, with 2–3 capitula; peduncles to sparsely pubescent with short hairs 0.7 mm long and with occasional glands 0.2 mm long, with scattered stellate hairs. Involucres 12.5 mm long; involucre bracts narrow, acute, pubescence to scattered (40) with hairs 1 mm long and moderately (50) glandular with short glands 0.1–0.3 mm long, almost without stellate hairs. Corollas saffron-yellow. Stigmas yellow. Flowering July to August.

Stony bank of mountain stream.—*European Part*: Arctic Europe. Endemic. Described from Linahamari (Kola Peninsula). Type in Kirovsk.

Note. In habit, it resembles *H. umbricola* Sael., differing from it by having yellow stigmas and a larger number of very small glands.

Cycle 5. *Adela* Juxip.—Number of hairs on involucre bracts many times more than glands (90:10); coefficient of leafiness 0.09, i.e., cauline leaves 5; involucre bracts densely stellate-hairy.

404. ***H. adelum* Juxip** in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 517.

Perennial. Stem 55 cm high, 1.5 mm in diameter, with scattered hairs 2 mm long at base, eglandular. Basal leaves 2, lanceolate, to 15 cm long (4:1), abruptly cuneately narrowed to petiole, broad, short-acuminate, barely noticeably short-toothed, olive-green, with occasional hairs 0.5 mm long above, scattered-pubescent beneath and along margin with hairs 0.5–1.5 mm long, to densely pubescent along midrib beneath, as a whole scattered-pubescent; cauline leaves 5 (coefficient of leafiness 0.09), ovate to rhomboid and lanceolate, broad (3.5:1),
352 uniformly distributed along stem, with 5–7 acute, unequal teeth, short-acuminate, pubescence as in basal leaves. Inflorescence spreading, dichotomously paniculate, with 6–8 capitula; peduncles with occasional hairs, eglandular, scatteredly stellate-hairy. Involucres 9 mm long; involucre bracts lanceolate, obtuse, with scattered (30) hairs, light-colored, 1 mm long, with occasional (4), glands 0.3 mm long, densely stellate-hairy. Stigmas dark. Flowering July.

Dry pine forest on alvar.—*European Part:* Baltic Region (Estonian SSR). Endemic. Described from vicinity of Khaapsalu. Type in Tartu.

Note. It is distinguished from the other species of *Caesia* by a high coefficient of leafiness and broad cauline leaves.

Cycle 6. *Caesia* Juxip.—*Grex H. caesium* (Fr.) Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III (1894) 7; Zahn in Pflzr. IV, 280, 437.—Hairs on involucre bracts many times more than glands (80:20); all involucre bracts (or at least inner ones) acute or very acute, narrow; coefficient of leafiness 0.04–0.02, i.e., cauline leaves 1–2 (–4); pubescence of leaves scattered to moderate.

405. ***H. osiliae* Dahlst.** Beitr. Hier.-Fl. Oesels (1901) 38; Zahn in Pflzr. IV, 280, 444; Asch. and Graebn. Synopsis, XII, II, 682.—**Ic.:** Dahlst. Beitr. (op. c.) t. V, fig. 2.

Perennial. Stem 25–85 cm high, 1.0–3.5 mm in diameter, reddish-violet at base, glabrous or with occasional hairs, eglandular. Basal leaves 2–8, ovate to lanceolate, abruptly narrowed to long petiole,

usually with broad, short teeth (4–5), toward base of lamina teeth coarser and sharper, sometimes with free teeth on petiole, to 16 cm long (5:1) (quite rarely deeply lobed-incised—*f. syrveense* Juxip), olive-green, often violet or red beneath, with sparse hairs 1 mm long above, with scattered hairs 1.2 mm long beneath, moderate pubescence along margin with hairs 1 mm long, dense hairs along midrib 1.5 mm long, as a whole to moderately pubescent; cauline leaves 2(1–4) (coefficient of leafiness 0.04), bottom leaf large, lanceolate, petiolate, resembling inner basal leaf, acuminate, upper leaf (leaves) smaller, sessile, entire. Inflorescence dichotomously paniculate, with 2–11 capitula; peduncles without simple hairs and glands, tomentose. Involucres (9–)10–11(–12) mm long; involucre bracts somewhat broad, abruptly acuminate at tip, with sparse to scattered, 24(10–45), hairs 1 mm long, with occasional (to sparse), 6(1–20), glands 0.2–0.3 mm long, along margin more or less stellate-hairy. Stigmas greenish, dark on drying. Flowering June to July.

Forested slopes of moraines, meadows overgrown with forest and scrub, mossy coniferous forests, burn clearings.—*European Part*: Karelia-Lapland (southern part), Baltic Region (Estonian SSR). Endemic? Described from Saaremaa (Oesel) Island. Type in Stockholm; cotype in Riga.

353 **Note.** In habit it resembles *H. vulgatum*, differing from it by having a dichotomous inflorescence, small glands on the involucre bracts, and broader leaves.

Dahlstedt's statement in the original diagnosis, "squamis... eglandulosis," needs correction in the sense that on all the original specimens glands were observed on the involucre bracts (even if only here and there).

406. **H. steinbergianum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk. SSSR, XIX (1959) 518.

Perennial. Stem 40–70 cm high, 2–3 mm in diameter, glabrous or with occasional hairs at base, eglandular. Basal leaves 4–10, rosulate, outer round to elliptical, small, abruptly attenuated to short petiole, very short-acuminate, inner ovate to lanceolate, abruptly or cuneately narrowed to long, winged petiole, short- to long-acuminate, to 16 cm long (4.5:1), with many (8–15) acute teeth along whole margin, with alternating large and small, triangular, lanceolate, falcate, broad and narrow teeth, with free teeth on petiole, grass-green, violet beneath, more or less glabrous above, to moderately pubescent beneath and along margin with hairs 0.7–1.5 mm long, densely so along midrib beneath with hairs 2 mm long, as as whole moderately pubescent; cauline leaves (1–)2(–3) (coefficient of leafiness 0.03), lanceolate,

short-petiolate to sessile, sharply and deeply serrate with fine teeth, acute. Inflorescence paniculate-corymbose, with 5–21 capitula; peduncles with occasional (to sparse) hairs, (almost) eglandular, weakly tomentose. Involucres 10.5–12.0 mm long; involucral bracts linear, acute, sparse to scattered, 25(11–37), hairs 1 mm long, with occasional, 10(–16), glands 0.2 mm long, with scattered to dense stellate hairs. Stigmas dark (brownish). Flowering June to July.

Sunny calcareous-stony slopes.—*European Part*: Baltic Region (Estonian SSR). Described from vicinity of Rapla. Type in Tartu.

Note. It is distinguished from the closely related species *H. osiliae* Dahlst. by many-toothed leaves and dark stigmas.

407. **H. galbanum** Dahlst. ex Anders. in Bot. Not. (1890) 92; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III, 20; Norrl. in Mela-Cajander, Suom. Kasvio, 719; Zahn in Pflzr. IV, 280, 440; Joh. and Sam. Dalarn. Hier. Vulgatif. 31; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 621; Asch. and Graebn. Synopsis, XII, II, 679; Samuelsson Maps of Scand. Hier. sp. No. 92.—*H. atrum* Dahlst. Beitr. Hier.-Fl. Oesels, 36.—**lc.**: Dahlst. Beitr. (l. c.) t. IV, fig. 2.—**Exs.**: Dahlst. Hier. exs. I, No. 70, 71; Herb. Hier. Scand. cent. II, Nos. 10–19, V, No. 53a, b, IX, Nos. 54, 55, X, Nos. 31, 32, XVII, No. 77; Norrl. Hier. exs. fasc. VIII, Nos. 51–57; Lindb. f. pl. Finl. exs. No. 1736.

- 354 Perennial. Stem 30–75 cm high, 1–3 mm in diameter, glabrous or with occasional (rarely to sparse) hairs 1.5 mm long, eglandular below. Basal leaves 2–8, outer small, round to ovate or elliptical, obtuse, inner longer (to 23 cm long), broadly ovate to elliptical or lanceolate, abruptly narrowed to quite long petiole, short-acuminate (4.5:1), with few (3–6) remote, forwardly spreading or directed, acute, unequal teeth, at base of lamina teeth often coarser and longer, leaves light (yellowish), grass-green, often violet beneath, glabrous or with occasional (toward margin) hairs above, with sparse hairs 1 mm long beneath, sparsely to moderately pubescent along margin, hairs 1 mm long, along midrib beneath hairs to dense, 1.5–2.0 mm long, as a whole to scattered-pubescent (outer leaves of rosette usually more densely pubescent after winter); cauline leaves (0–)1–2(–3) (coefficient of leafiness 0.03), resembling inner basal leaves, bottom leaf often large, upper small, pubescence to barely sparse, acuminate. Inflorescence dichotomously paniculate, with 2–14 capitula; peduncles glabrous or with occasional hairs, eglandular or with occasional small glands, with more or less scattered stellate hairs. Involucres (9–)10–13 mm long, ovate, later truncate; involucral bracts broad, blackish-green, often with light-colored border, of three forms: outer bracts short, quite obtuse, middle—longer, subobtuse, inner—long, acute, with sparse, 22(10–40), hairs

1 mm long (with dark base and short, light-colored cusp), with occasional, short glands 0.2–0.3 mm long or sometimes without them altogether, 6(0–17), more or less without stellate hairs or with scattered hairs along margin, with apical tuft. Stigmas dark (in our plants). Flowering June to July. (Plate X, Fig. 1.)

Open forests on alvars, on glints, forested moraines, slopes, always on calcareous soils.—*European Part*: Karelia-Lapland (southern part), Ladoga-Ilmen (northern part), Baltic Region (Estonian SSR, western part), Upper Dniester. *General distribution*: Scandinavia, Central Europe. Described from Sweden. Type in Stockholm.

Note. The specimens collected from the Estonian SSR were treated by Dahlstedt as a separate species—*H. atrum* Dahlst. However, in view of the fact that the difference between the above-named and the Swedish (typical) plants is very slight (darker hairs on the involucre bracts) and, according to the statement of Dahlstedt himself, similar plants are also found in the *locus classicus*, we did not consider it necessary to treat them separately. Also, on our plants, one can often observe the phenomenon reported by Dahlstedt: deforming swellings in the inflorescence coming from insect bites or pricks and oozing gum resin; a condition that became the basis for the name of the species (*galbanum*—gum resin).

408. **H. caesium** Fr. Novit. Fl. Suec. ed. 1 (1819) 76, pro *H. vulgati* var. β , p. p.; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III (1894) 10; Beitr. 355 Hier.-Fl. Oesels, 34; Zahn in Pflzr. IV, 280, 437; Joh. and Sam. Dalarn. Hier. Vulgatif, 14; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 620; Samuelsson, Maps of Scand. Hier. sp. No. 77.—*H. eucaesium* Zahn in Asch. and Graebn. Synopsis, XII, II, 676.—*H. bifidum* Fr. Epicr. (1862) 93 p. p.—*H. bifidum* (Fr.) Lbg. in Blytt Norg. Fl. II (1874) 657 and in Hartm. Handb. Scand. Fl. ed. 11 (1879) 45; Norrl. in Mela-Cajander, Suom. Kasvio, 720.—*H. plumbeum* Fr. Symb. (1848) 111 p. p.—*H. plumbeum* var. *bifidum* Norrl. Bidr. Skand. Hier.-Fl. I (1888) 102.—*H. caesiiforme* Brenn. Finnl. Hier. form, fasc. IV (1895) 13.—*H. danicum* Arv.-Touv. Herb. Boiss. (1847) 731, non Dahlst.—**Exs.**: Fries, Herb. norm. fasc. XII, No. 21, pro *H. plumbeo*; Hier. Europe. Nos. 86, 86b; Dahlst. Hier. exs. fasc. II, Nos. 48, 49; Herb. Heir. Scand. cent. II, Nos. 5–8, III, No. 91, IV, Nos. 10–12, XIII, No. 62; XXI, No. 6; Norrl. Hier. exs. No. 125; GRF No. 775a; Baenitz, No. 2384.

Perennial. Stem 30–65 cm high, 1.0–2.5 mm in diameter, glabrous or with occasional hairs 1–3 mm long at base, eglandular. Basal leaves 2–8, ovate, elliptical to lanceolate, narrowed to petiole, with remote, short teeth or at base with 1–3 larger teeth, short-acuminate to 16 cm long, broad (4:1), glaucous, bluish-gray-violet beneath, glabrous above

(sometimes with occasional short hairs), with occasional hairs 1 mm long beneath, with hairs to scattered, 1 mm long, along margin, to densely pubescent along midrib beneath with hairs 1.5 mm long, as a whole to scattered-pubescent (most often sparse, however); cauline leaves 1–2 (coefficient of leafiness 0.03), in lower half of stem, lanceolate, cuneately tapered to short petiole, with 1–2 teeth, acuminate, sparsely pubescent, stellate-hairy beneath. Inflorescence dichotomously paniculate, with 2–12 capitula; peduncles glabrous or with occasional hairs, eglandular or with occasional glands, tomentose. Involucres 10–13 mm long; all involucral bracts acute, inner subulate (particularly conspicuous before anthesis), sparsely, 24(14–38), pubescent with hairs 1 mm long, with occasional, 5(0–17), glands 0.2–0.5 mm long, with very scattered stellate hairs at base. Corollas light yellow. Stigmas yellow or somewhat dark. Flowering June to July (August).

Calcareous rocks of glints, in open pine forests on alvars, sunny slopes and rocks, preferably (almost exclusively) on calcareous soil.—*European Part*: Karelia-Lapland, Dvina-Pechora (western part), Ladoga-Ilmen (central part), Baltic Region (western part). *General distribution*: Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type in Stockholm? Uppsala?

409. **H. ravusculum** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. III (1894) 15; Beitr. Hier.-Fl. Oesels, 35; Zahn in Pflzr. IV, 280, 438; Asch. and Graebn. Synopsis, XII, II, 677.—*Exs.*: Dahlst. Hier. exs. No. 50; Herb. Hier. Scand. cent. II, No. 9.

- 356 Perennial. Stem 25–55 cm high, 1.5–2.0 mm in diameter, almost glabrous and eglandular. Basal leaves 2–8, outer small, inner larger, to 13 cm long, ovate-lanceolate, broad (4:1), narrowed to petiole, short-acuminate, remotely denticulate (teeth somewhat larger toward base), glaucous, glabrous above (or with occasional hairs toward margin), with occasional hairs beneath and along margin, sparsely pubescent along midrib beneath, as a whole pubescence to scattered, cauline leaves 1–2(–3) (coefficient of leafiness 0.04), oblong-lanceolate, very acuminate, with occasional teeth, sparsely pubescence, stellate-hairy beneath. Inflorescence dichotomously paniculate, with 3–10 capitula; peduncles with occasional, hairs 1 mm long or glabrous, eglandular or with occasional glands 0.3 mm long, tomentose. Involucres (9–)10–12 mm long; involucral bracts narrow, very acute, with sparse, 21(15–25), hairs 1 mm long and occasional, 3(1–6), glands 0.3–0.4 mm long, densely stellate-hairy. Stigmas dark. Flowering July to August.

Dry forests, stony cliffs, on calcareous soil.—*European Part*: Karelia-Lapland, Dvina-Pechora, Baltic Region (western part). *General distribution*: Scandinavia, Central Europe. Described from Sweden. Type in Stockholm.

Note. It is distinguished from the very closely related, *H. caesium* Fr. by having dense stellate hairs on the involuclral bracts.

Subsection 7. *Bifida* Juxip.—Zahn in Pflzr. IV, 280 (1921) 406 ut sp. coll.; Zahn in Asch. and Graebn. Synopsis, XII, II, 362, 605 ut sp. coll.—Characters in key. Coefficient of leafiness 0.02(0.01–0.05(0.08)), i.e., cauline leaves 0 to 2(–4); basal leaves at anthesis 2 to 10, i.e., basal rosette usually well-developed; stem scapose, dichotomous; involuclral bracts distinctly pubescent and with scattered small glands (in ratio of 90:10 to 40:60), or less often with marked number of glands (20:80); almost without pollen.

Species of this subsection are found in Central and Northern Europe and have been identified as definite calciphilous plants. In the USSR, they are mainly found in the northwestern part of the European Territory of the Soviet Union, although some species have spread almost to the Urals Range.

1. Coefficient of leafiness more or less high (0.07), i.e., cauline leaves 2–4 (not typical of the subsection, representing a transition from subsection *Bifida* to section *Prenanthoidea*).....410. ***H. wimmeri*** Uechtr.
- + Coefficient of leafiness low (0.04–0.01).....2.
2. Number of glands on involuclral bracts many times more than number of hairs (latter 0–13).....3.
- + Number of glands and hairs on involuclral bracts more or less equal or number of hairs many times more than number of glands.....4.
- 357 3. Involucres short (8–9 mm long); involuclral bracts densely stellate-hairy; peduncles very densely glandular; leaves densely pubescent.....411. ***H. triangulare*** Almqu.
- + Involucres large (10–)11–12 mm long; involuclral bracts slightly stellate-hairy; peduncles sparsely glandular; leaves moderately pubescent.....412. ***H. submaculosum*** Dahlst.
4. Number of hairs and glands on involuclral bracts more or less equal.....5.
- + Number of hairs on involuclral bracts many times more than number of glands (or latter almost entirely absent).....19.
5. Ratio of hairs to glands on involuclral bracts approximately 30:70.....6.
- + Ratio of hairs to glands on involuclral bracts approximately 50:50 (i.e., equal).....7.
6. Peduncles with occasional glands; leaves dark green, without spots, moderately pubescent.....414. ***H. prolixum*** Norrl.

- + Peduncles with large number (to scattered) of glands; leaves light glaucous, usually with blackish-violet spots, scattered-pubescent.....413. **H. maculosum** Dahlst.
- 7. Hairs on involucre bracts sparse (12–36).....8.
- + Hairs on involucre bracts in large numbers (scattered) (40– ~).....17.
- 8. Stigmas yellow.....9.
- + Stigmas dark.....11.
- 9. Peduncles with many short hairs.....417. **H. virelliceps** Norrl.
- + Peduncles glabrous or with occasional hairs.....10.
- 10. Basal leaves (even inner) more or less entire, oval, scatteredly pubescent; involucre bracts almost without stellate hairs.....415. **H. macrochlorellum** Litw. and Zahn
- + Basal leaves with coarse teeth, lanceolate, densely pubescent (although glabrous above); involucre bracts distinctly stellate-edged; plants of Baltic Region.....416. **H. caesiiflorioides** Juxip
- 11 (8). Involucre bracts distinctly stellate-hairy; plants of Urals.....424. **H. petropavlovskianum** Juxip
- + Involucre bracts without stellate hairs (or with sparse hairs, predominantly at base).....12.
- 12. Peduncles eglandular and glabrous or with occasional glands and hairs.....13.
- + Peduncles distinctly (scatteredly) glandular (and pilose); leaves very densely pubescent, although glabrous above; plants of Baltic Region.....418. **H. astibes** Juxip
- 358 13. Leaves more or less entire, densely pubescent on both sides; plants of Kola Peninsula.....419. **H. riparium** Juxip
- + Leaves toothed.....14.
- 14. Leaves moderately pubescent; plants of Baltic Region.....15.
- + Leaves scatteredly to sparsely pubescent.....16.
- 15. Base of lamina gradually narrowed to petiole; inflorescence umbellate-paniculate; peduncles with occasional hairs and glands.....420. **H. intercessum** Juxip
- + Base of lamina truncate; inflorescence dichotomously paniculate; peduncles completely glabrous and eglandular.....421. **H. vagae** Juxip
- 16. Basal leaves abruptly or gradually, cuneately narrowed to winged petiole, scattered-pubescent; ligules (inner) of florets ciliolate; stigmas dull green, later turning dark.....422. **H. pendulum** Dahlst.
- + Basal leaves with sagittate or cordate base, sparsely pubescent (glabrous above); ligules eciliate; stigmas blackish.....423. **H. crispans** Norrl.

- 17 (7). Stigmas yellow; involuclral bracts distinctly stellate-hairy; leaves very densely pubescent; peduncles very distinctly (moderately) glandular; involucre 8–10 mm long; plants of Carpathian Mountains.....425. **H. cardiobasis** Zahn
- + Stigmas dark; involuclral bracts very sparsely stellate-hairy.....18.
18. Leaves with cordate or truncate base, moderately pubescent; peduncles with occasional glands; involucre 11–12 mm long.....427. **H. multifrons** Brenn.
- + Leaves with base narrowed to petiole, densely pubescent; peduncles with scattered glands; involucre 10 mm long.....426. **H. pahnschii** Juxip
- 19 (4). Hairs on involuclral bracts sparse (12–36).....20.
- + Hairs on involuclral bracts scattered (40–~); plants of Baltic Region.....30.
20. Stigmas yellow.....21.
- + Stigmas dark.....25.
21. Leaves very sparsely pubescent (almost glabrous).....22.
- + Leaves scatteredly to moderately pubescent.....23.
22. Cauline leaves 2–3 (not typical for *Bifida*); leaves more or less abruptly narrowed to petiole, all broad (3.6:1); peduncles glabrous and eglandular; plants of Baltic Region.....428. **H. oiense** Dahlst.
- + Cauline leaves 0–1, narrower than in previous species (5:1); peduncles with sparse hairs and occasional glands; plants of Kola Peninsula.....429. **H. kabanovii** Juxip
- 359 23. Leaves narrowed more or less gradually to long petiole, pubescence to moderate; plants of Baltic Region.....430. **H. cercidotematodes** Juxip
- + Leaves with obtuse, cordate, or truncate base or (inner basal leaves) abruptly narrowed to petiole.....24.
24. Leaves grassy-yellow-green, moderately pubescent; stigmas yellow (or green to dark); involuclral bracts more or less obtuse; plants of Baltic Region.....431. **H. caesiiflorum** Almqu.
- + Leaves light glaucous, scattered-pubescent; involuclral bracts acute (inner bracts subulate); plants of the North.....432. **H. stenolepis** Lindeb.
- 25 (20). Involuclral bracts without stellate hairs or weakly hairy.....26.
- + Involuclral bracts distinctly stellate-hairy.....28.
26. Peduncles glabrous and eglandular; leaves to densely pubescent; plants of Baltic Region.....433. **H. eichvaldii** Juxip
- + Peduncles pubescent and glandular; pubescence of leaves moderate or scattered.....27.

27. Peduncles with occasional hairs; of pubescence leaves moderately (sparsely above); involucre 12 mm long; plants of Urals.....434. **H. konshakovskianum** Juxip
 + Peduncles with sparse to scattered pubescence; pubescence of leaves scattered (glabrous above); involucre 10.0–11.5 mm long; plants of Kola Peninsula.....435. **H. auronii** Juxip
28. Leaves sparsely pubescent.....29.
 + Leaves moderately pubescent (but almost glabrous above); peduncles glabrous and eglandular....438. **H. sublividum** Dahlst.
29. Involucral bracts somewhat broad, triangularly narrowed, subobtusate, pubescent with simple, dark hairs, very densely stellate-hairy; plants of the North.....
436. **H. chlorellum** Sael. and Norrl.
 + Involucral bracts narrow, acute, with light-colored hairs, very densely stellate-hairy; plants of Baltic Region (western part).....437. **H. canitosum** Dahlst.
- 30 (19). Stigmas yellow (or greenish); peduncles with or without occasional glands and hairs; involucre more or less large (9.5–12.5 mm long).....31.
 + Stigmas dark; peduncles scattered-glandular and distinctly (sparsely) pubescent; involucre 9 mm long; leaves to densely pubescent.....441. **H. agnostum** Juxip
- 360 31. Involucral bracts sparsely stellate-hairy; stigmas greenish; leaves scattered-pubescent (glabrous above); cauline leaves 1–3.....439. **H. cauri** Juxip
 + Involucral bracts densely (whitish) stellate-hairy; stigmas yellow; leaves to densely pubescent (sparsely above); cauline leaves 1.....440. **H. albidulum** Stenstr.

Cycle 1. Wimmeria Juxip.—Coefficient of leafiness for subsection very high (0.07), i.e., cauline leaves 2–4; inflorescence to densely glandular, sparsely pubescent; cauline leaves somewhat amplexicaul.

410. **H. wimmeri** Uechtr. in Öster. Bot. Zeitschr. XXII (1872) 277; Fiek. Fl. Schles. (1881) 271; Zahn in Pflzr. IV, 280, 805; Asch. and Graebn. Synopsis, XII, III, 368.—*H. anglicum* Wimm. Fl. Schles. 3 (1857) 708, nec Fr.—*lc.*: Rechb. Ic. Fl. Germ. XIX, 2, p. 259, t. 229, A.—*Exs.*: F. Schultz, Herb. norm. n. s. No. 2861; Sudre, No. 82; Callier, Fl. Siles. exs. No. 469; Zahn, Hier. Europ. No. 681.

Perennial. Stem 20–60 cm high, slender, flexuous, slightly pubescent, sometimes branched right from base, sometimes with lateral stems. Basal leaves 3–6, elliptical or oblong-lanceolate, to 10 cm long (3.5:1), often oblique, abruptly or (rarely) gradually attenuated to petiole,

subobtusate to subacute, with many fine or short, remote teeth, at base incised-toothed, with free teeth on petiole, dark glaucous, pale glaucous beneath, with slightly reticulate venation, glabrous and lustrous above, pubescence elsewhere to barely sparse; cauline leaves 2–4 (coefficient of leafiness 0.07), lanceolate, short-petiolate, mostly somewhat amplexicaul, lower leaves to larger, denticulate, at base coarsely (more or less lacerately) toothed, acute, upper leaves sessile, small, bracteiform. Inflorescence openly paniculate, with long divergent branches, with 3–10(–25) capitula; peduncles more or less glabrous or with occasional dark hairs and occasional glands, stellate-hairy. Involucres 10–12 mm long; involucre bracts dark, somewhat narrow, obtuse to subacute, pubescence to scattered, 30(20–40), with hairs 1.0–0.5 mm long, dark, with black base, to moderately, 28(20–50), glandular, glands 0.4–0.1 mm long, very sparsely to scatteredly stellate-hairy. Corolla teeth ciliate. Stigmas dark. Achenes reddish-brown, 3.5 mm long. Flowering June to July.

Mountains at 1250–1900 m, gravelly slopes.—*European Part*: Upper Dniester (Carpathian Mountains). *General distribution*: Central Europe. Described from Sudeten. Type unknown.

Note. The species is intermediate between subsection *Bifida* and section *Prenantheroidea*. In our country, it is found in the Eastern Carpathians on the Pope Ivan and Syvula mountains.

Cycle 2. Triangularia Juxip.—Number of glands in inflorescence (involucre bracts, peduncles) many times more than number of hairs.

- 361 411. **H. triangulare** Almqu. Stenstr. Värml. Arch. (1889) 17; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II, 69; Norrl. in Mela-Cajander, Suom. Kasvio, 698; Zahn in Pflzr. IV, 280, 390; Joh. and Sam. Dalarn. Hier. Silvaticif. 88; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 615; Samuelsson, Maps of Scand. Hier. sp. No. 69.—*H. murorum* L., **sagittatum* Almqu. in Thedenius, Fl. Upl. o. Söderl. (1871) 360.—*H. silvaticum* L. ssp. 3 *triangulare* Almqu. Stud. (1881) p. XIV.—**Exs.**: Dahlst. Hier. Scand. cent. I, Nos. 27, 28, IV, Nos. 20, 21, XXIV, No. 54; Norrl. Hier. exs fasc. IX, No. 76.

Perennial. Stem 25–60 cm high, 1–2 mm in diameter, violet at base, almost glabrous or with occasional hairs, sometimes scattered-glandular and sparsely stellate-hairy above. Basal leaves 4–5, cordate-ovate or ovate-triangular (4:1), with truncate or sagittate base, obtuse to acute, unevenly and unequally toothed with 6–10 broad, short, teeth along entire margin, at base deeply incised to lobed, with free teeth on long petioles, dark green, pale glaucous or violet beneath, hairs scattered above, 0.3 mm long, hairs to dense beneath, 1 mm long, dense

along margin, 0.5 mm long, along midrib beneath very dense, 2 mm long as a whole densely pubescent; cauline leaves 0–1 (coefficient of leafiness 0.01), short-petiolate, from broad base tapered to long cusp, triangular-lanceolate, at base subulately lacerate-toothed, often small. Inflorescence dichotomously paniculate, with 2–6(10) capitula; peduncles glabrous (or with occasional hairs below capitulum), but very densely and finely glandular, glands 0.3 mm long, scatteredly tomentose. Involucres short, 8–9 mm long, ovate, variegated; involucre bracts black, from quite broad base, triangularly, lanceolately narrowed, obtuse, glabrous or sometimes with occasional hairs (0–7), but moderately (60) glandular, glands 0.2–0.3 mm long, along margin densely white-tomentose. Stigmas dark. Flowering June to July.

Calcareous rocks.—*European Part*: Ladoga-Ilmen (northern part). *General distribution*: Scandinavia. Endemic. Described from Sweden. Type in Stockholm.

Note. Zahn (l. c.) systematically regards this species as an intermediate between *Muroria* and *Caesia*; however, both in characters and habit this plant is closer to *Bifida*. Evidently, Dahlstedt, who placed it (*Svensk Fan.-Fl.* l. c.) in immediate proximity with species of subsection *Bifida*, also held this opinion. This view is also shared by Norrlin.

412. **H. submaculosum** Dahlst. Beitr. Hier.-Fl. Oesels (1901) 25; Zahn in Pflzr. IV, 280, 426 (nota).—*H. prolixum* Norrl. f. e. *submaculosum* Dahlst. ex Asch. and Graebn. Synopsis, XII, II, (1935) 644.—**Ic.**: Dahlst. op. c. t. I, fig. 1.

362 Perennial. Stem 35–60 cm high, 1.5–2.0 mm in diameter, violet at base, glabrous, or with occasional hairs in basal part, sometimes with occasional glands above. Basal leaves 3–8, ovate to broadly lanceolate, to 15 cm long (3.5:1), with obtuse, truncate, or sagittate base, more or less long-petiolate, unevenly 7–13 serrate-toothed along entire margin at base with lobed, large, acute, and recurved teeth and with free teeth on petiole, glaucous, paler or violet beneath, glabrous above, hairs to scattered beneath, 1 mm long, moderate along margin, 0.8 mm long, very dense along midrib beneath, 2 mm long, as a whole pubescence moderate; cauline leaves 0–1 (coefficient of leafiness 0.01), mostly narrowly lanceolate, short-petiolate or sessile, unequally toothed with many acute teeth, very acute, stellate-hairy beneath (along midrib). Inflorescence spreading, dichotomously paniculate, with 3–7 capitula; peduncles without simple hairs but with sparse glands 0.4 mm long, tomentose. Involucres (10–)11–12 mm long, ovate, involucre bracts narrow, linear, subobtusate to acute, with occasional, 8(3–13), hairs

0.5–1.0 mm long and scattered, 33(23–44), glands 0.4 mm long, slightly stellate-hairy. Stigmas dark. Flowering June to July.

Forested slopes of moraines, on calcareous soils.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Saaremaa (Oesel) Island. Type in Stockholm.

Note. According to Dahlstedt, this species occupies an intermediate position between *H. prolixum* Norrl. and *H. maculosum* Dahlst. Zahn (*Synopsis* l. c.) is inclined to consider it simply as a form of *H. prolixum* Norrl.

Cycle 3. Prolixa Juxip.—*Grex H. subcaesium* (Fr.) Zahn in Pflzr. IV, 280 (1921) 420.—Hairs and glands in inflorescence in ratio of 30:70.

413. **H. maculosum** Dahlst. in Stenstr. Värml. Arch. (1889) 12; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II, 65; Zahn in Pflzr. IV, 280, 420; Joh. and Sam. Dalarn. Hier. Silvaticif. 42; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 615; Asch. and Graebn. Synopsis, XII, II, 638; Samuelsson, Maps of Scand. Hier. sp. No. 47.—*H. caesitium* Norrl. Herb. Mus. Fenn. 2 ed. (1889) 150; in Mela-Cajander, Suom. Kasvio, 702.—*H. silvaticum* L. ssp. 2 *silvaticum* L. F. inv. minorib. Almqu. Stud. (1881) p. XIII.—**Exs.**: Dahlst. Hier. exs. fasc. I, No. 47, II, No. 24, IV, No. 55; Herb. Hier. Scand. cent. III, No. 85, XI, No. 8, XVII, No. 12, XX, No. 63; Norrl. Hier. exs. fasc. VI, Nos. 28–32.

363 Perennial. Stem 30–70 cm high, 1–3 mm in diameter, colored at base, glabrous or with occasional hairs, with occasional glands above, more or less without stellate hairs. Basal leaves 2–8, only outer small, ovate or obovate, with obtuse base, obtuse, broad (3:1), inner oblong-ovate to oblong-lanceolate, often large, to 22 cm long, broad to narrow (4–6:1), with truncate base, abruptly narrowed to petiole, subobtuse to acute, long-petiolate, with 4–10 remote, triangular teeth along whole margin, with deeply lacerate teeth at base, narrow and acute, with free, hastate teeth on petiole, light glaucous, very often with blackish-violet spots, glaucescent beneath; (almost) glabrous above, with sparse to scattered hairs 0.6–1.0 mm long beneath and along margin, hairs 1.5–2.5 mm long along midrib beneath, as a whole pubescence scattered, leaves sparsely stellate-hairy beneath; cauline leaves 0–1(–2) (coefficient of leafiness 0.02), narrowly lanceolate, acute, (6–8:1), with 10–15 teeth, at base deeply lacerate and hastate, with free teeth on petiole, often linear (15–30:1), acute, small. Inflorescence dichotomously corymbose, with 2–8 capitula; peduncles with occasional hairs 1 mm long, and sparse to scattered glands 0.3 mm long, tomentose. Involucres 9–11 mm long, ovate; involucral bracts narrowly linear, subobtuse to acute and subulate, with occasional, 13(10–15), hairs 0.5–1.0 mm long

and scattered, 30(26–34), glands 0.3–0.4 mm long, sparsely stellate-hairy. Stigmas dark. Flowering June to August.

Open stony slopes, pine-birch and spruce forests, on stony (calcareous) soil, deciduous stands.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type in Stockholm.

414. **H. prolixum** Norrl. Bidr. Skand. Hier.-Fl. I (1888) 94; in Mela-Cajander, Suom. Kasvio, 702; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II, 61; Williams, Prodr. (1902) 136; Zahn in Pflzr. IV, 280, 425; Asch. and Graebn. Synopsis, XII, II, 644; Joh. and Sam. Dalarn. Hier. Silvaticif. 72; Dahlst. in Lindm. Svensk. Fan.-Fl. 2, ed. 614; Samuelsson, Maps. of Scand. Hier. sp. No. 63.—*H. silvaticum* L. ssp. *silvaticum* var. 3 Almqu. stud. (1881) p. XIV.—*Exs.*: Dahlst. Hier. exs. fasc. I, No. 46; Herb. Hier. Scand. cent. I, No. 22, III, No. 82, XXII, No. 6 (pro *H. prolixiceps*); Norrl. Hier. exs. No. 115, fasc. IX, No. 80.

Perennial. Stem 25–55 cm high, 1.0–2.5 mm in diameter, violet at base, glabrous (or sometimes with sparse hairs), more or less eglandular and sparsely stellate-hairy above. Basal leaves 5(2–7), ovate to ovate-oblong and ovate-lanceolate, to 16 cm long (4.2:1), with base truncate, sagittate or abruptly narrowed to short petiole, obtuse to short-acuminate (or acute), irregularly sharp-toothed with 3–10, remote, forward-directed serrate teeth or at base acute, recurved teeth, with free lanceolate teeth on petiole, dark green, glaucous and often violet-red beneath exactly like petiole, almost glabrous and lustrous above, with sparse hairs 0.5–1.0 mm long beneath, along margin hairs moderate, 0.5–1.0 mm long, hairs dense along midrib beneath, 1.0–2.5 mm long, as a whole to moderately pubescent, leaves somewhat stellate-hairy beneath; cauline leaves 0–1(–2) (coefficient of leafiness 0.03), narrow, 364 linear or ovate-lanceolate, irregularly, lacerately sharp-toothed, plicate-acuminate, sessile or short-petiolate, often recurved, stellate-hairy beneath. Inflorescence spreading-paniculate, with long, divergent branches and 2–8 capitula; peduncles glabrous or with occasional hairs 1 mm long and occasional glands 0.2–0.5 mm long, tomentose. Involucres 9–10 mm long, turbinate; involucre bracts narrow, linear, subobtusate to (inner ones) subulate, with occasional, 12(3–17), hairs 0.7–1.0 mm long and sparse, 24(10–35), glands 0.3–0.6 mm long, almost without stellate-hairs or with hairs at base only. Stigmas dark gray, later turning black. Flowering June to August.

Stony ridges, gravelly riverbanks, birch-fir forests on schistose mountains, in subalpine zone of mountains, forest edges.—*European Part*: Karelia-Lapland, Dvina-Pechora, Volga-Kama (Urals) Region, Middle Dnieper, Upper Dniester (?).—*General distribution*:

Scandinavia, Central Europe, Atlantic Europe. Described from Sweden. Type in Helsinki.

Note. On his map Samuelsson shows the Åland Islands as the eastern limit of this species (l. c.). However, *H. prolixum* Norrl. has a much wider range, being found in the Kola Peninsula (Khibiny Mountains, Kandalaksha), Kargopol and Petrozavodsk districts, in the northern and central Urals and also in Western Ukraine and (according to published information) in Poland (Tatry).

Cycle 4. Pendula Juxip.—Hairs and glands in inflorescence in more or less equal numbers; coefficient of leafiness low (from 0.04 to 0.01), i.e., cauline leaves 0–1(–2); hairs on involucre bracts more or less sparse.

415. **H. macrochlorellum** Litw. and Zahn in Sched.; Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 518.

Perennial. Stem up to 60 cm high, 2 mm in diameter, barbate, (almost) glabrous, eglandular, sparsely stellate-hairy. Basal leaves 4(3–8), ovate to oblong-ovate or ovate-lanceolate, to quite large (17 cm long), broad (3.5:1), with cordate or truncate base or abruptly contracted to long, slender petiole, obtuse to retuse, subobtusely spinescent or short-acuminate, more or less entire or with 4–7 fine teeth in lower part, entire above, dark glaucescent green, paler beneath, with occasional hairs 0.5 mm long above, to moderately pubescent beneath and along margin, hairs 1 mm long, to densely pubescent along midrib beneath and on petiole, hairs 1.5–2.0 mm long, as a whole to moderately pubescent; cauline leaves 1(2) (coefficient of leafiness 0.03), ovate-lanceolate, resembling basal leaves, with truncate base, petiolate, acuminate, upper leaf (if present) short-petiolate, acute, stellate-hairy beneath along midrib. Inflorescence dichotomously open-paniculate, with 3–5 capitula; peduncles without simple hairs, with occasional glands 0.3 mm long, slightly tomentose. Involucres 10–11 mm long, ovate; involucre bracts narrow, acute, dark, with light green border, barbate, with sparse (20), light-colored hairs 1 mm long and equally sparse, 23(18–28), fine glands 0.3 mm long, sparsely stellate-hairy toward base. Stigmas dull yellow. Flowering June to July.

Deciduous forests on hills on calcareous soil.—*European Part:* Ladoga-Ilmen. Endemic? Described from Duderhof. Type in Leningrad.

416. **H. caesiiflorioides** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 519.

Perennial. Stem 50–55 cm high, 2 mm in diameter, glabrous (often several stems). Basal leaves 5, ovate to ovate-lanceolate, to 15 cm long, with cordate or truncate base, long-petiolate, broad (3:1), outer

leaves scarcely toothed, inner with coarse triangular teeth, teeth at base of lamina sagittate-recurved, with free teeth on petiole, acute, yellowish-grass-green, often violet beneath, glabrous above, with scattered hairs beneath 0.7 mm long, densely pubescent along margin, hairs 1 mm long, and very densely so along midrib beneath, hairs 2 mm long, as a whole densely pubescent, leaves quite distinctly stellate-hairy beneath; cauline leaves 0–1 (coefficient of leafiness 0.01), on lower 1/4th of stem, ovate, petiolate, sparsely pubescent (glabrous on both sides, hairs scattered along margin and veins), i.e., leaf pubescence hardly on 1/4th of basal leaves, but leaves densely stellate-hairy beneath, often small, bracteiform. Inflorescence dichotomously paniculate, with 6 capitula; peduncles with occasional hairs and glands, tomentose. Involucres 10.5 mm long; involucre bracts narrow, subobtusate to acute, with sparse (20) hairs 1 mm long and equally sparse (20) glands 0.3 mm long, moderately stellate-hairy along margin. Stigmas yellow or olive green. Flowering June to July.

European Part: Baltic Region (Estonian SSR). Endemic. Described from Hiiumaa (Dagö) Island. Type in Riga.

Note. This plant collected by K. Kupffer was identified by Dahlstedt as *H. caesiiflorum* Almqu., but, as it is distinguished from the latter by the large number of glands in general and the ratio of hairs and glands on the involucre bracts in particular, we are treating it as a separate species. The diagnosis of *H. caesiiflorum* Almqu. reads: "Squamae...pilis brevibus sparsis—sat densis et glandulis solitariis minutis obtectae," and this conforms well with the results from the analysis of the exsiccatae. According to the results of this analysis, the hairs-to-glands ratio is 80:20, whereas in our plant it is 50:50. In habit, too, it in fact is very similar to *H. caesiiflorum* Almqu. and also has characteristics similar to *H. macrochlorellum* Litw. and Zahn.

417. **H. virelliceps** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 702; Zahn in Pflzr. IV, 280, 427 (nota).

366 Perennial. Stem 35–45 cm high, 2 mm in diameter, sulcate, green, with occasional hairs, sometimes with occasional glands above. Basal leaves 3–5, lanceolate, with truncate base or more or less abruptly narrowed to long, slender petiole, acute (5:1), with 5–8 small, remote teeth, teeth at base more or less large and acute, with free teeth on petiole, light green, glabrous above, moderately to densely pubescent beneath with hairs 1 mm long, moderately pubescent along margin, very densely so along midrib beneath, as a whole densely pubescent; cauline leaves 1 (coefficient of leafiness 0.03), lanceolate, sessile, acute, entire, usually small. Inflorescence spreading, dichotomously paniculate, with 2–4 capitula; peduncles with sparse to scattered pubescence,



with hairs 1 mm long, with occasional glands 0.3 mm long, densely tomentose. Involucres 9–10 mm long; involucre bracts narrow, acute, bright green, pubescence to scattered, 30(23–36), with hairs 1 mm long and scattered (30) glands 0.3 mm long, sparsely stellate-hairy at base. Stigmas yellow (to dark). Flowering July to August.

Edges and short-grass meadows in forests.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki.

418. **H. astibes** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 519.

Perennial. Stem 50 cm high, 1.5 mm in diameter, pubescence to scattered below, with occasional glands above. Basal leaves 4, ovate to narrowly lanceolate, to 16 cm long (6:1), glabrous above, densely pubescent beneath and along margin, hairs 1 mm long, very densely pubescent along midrib beneath (and petiole), hairs 1.5 mm long, as a whole very densely pubescent; cauline leaves 2 (coefficient of leafiness 0.04), broadly lanceolate (3.3:1), densely pubescent. Inflorescence dichotomously paniculate, with 3 capitula; peduncles sparsely pubescent, scatteredly glandular, slightly tomentose. Involucres 10.5 mm long; involucre bracts sparsely, 21(18–24), pubescent with hairs 1 mm long, to scatteredly, 32(30–36), glandular, glands 0.3 mm long, sparsely stellate-hairy. Stigmas dark. Flowering June to July.

European Part: Baltic Region (Estonian SSR). Endemic. Described from Hiiumaa (Dagö) Island. Type in Tartu.

Note. It is distinguished from the closely related species of cycle *Pendula* by having distinctly glandular and pubescent peduncles and very densely pubescent leaves with, however, glabrous ventral surfaces, which is unusual for the subsection.

369 419. **M. riparium** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 520.

Perennial. Stem 30–40 cm high, 1.5–2.0 mm in diameter, violet at base, almost glabrous, sometimes with occasional glands above. Basal leaves 2–3, broadly lanceolate (3:1), abruptly narrowed to short petiole, subacute, with 3, scarcely noticeable, spinescent teeth (at first glance appearing entire), glaucous, densely pubescent on both sides and along midrib beneath with hairs 0.6–1.5 mm long, hairs scattered along margin, 1 mm long, as a whole to densely pubescent; cauline leaves 1 (coefficient of leafiness 0.03), lanceolate, cuneately narrowed to short petiole-like base, acuminate, entire, conspicuously stellate-hairy beneath, often small. Inflorescence dichotomously paniculate, with 2–4 capitula; peduncles with occasional hairs 1 mm long and with

occasional glands 0.4 mm long, tomentose. Involucres 10–11 mm long; involucre bracts narrow, acute, with sparse, 17(12–20), hairs 1.0–1.5 mm long and occasional, 13(8–16), glands 0.3–0.4 mm long, more or less without stellate hairs. Stigmas dark. Flowering July to August.

Lake shores.—*European Part*: Karelia-Lapland. Endemic. Described from Kola Peninsula, Monche Lake. Type in Leningrad.

Note. The species is remarkable for the dense pubescence of its leaves on both sides; such pubescence is very high for the subsection.

420. **H. intercessum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 520.

Perennial. Stem 60–75 cm high, 2 mm in diameter, with occasional hairs (almost glabrous), eglandular. Basal leaves 3–5, obovate, elliptical to lanceolate, more or less abruptly or gradually narrowed to long petiole, obtuse to retuse, with spinescent or short-acuminate tip, to 20 mm long, broad (4:1), with 8–15 unequal, sharply serrate teeth, with free teeth on petiole, dark green, with occasional hairs 0.6 mm long above, and hairs scattered 1.3 mm long beneath, along margin moderately pubescent with hairs 0.8 mm long, densely so along midrib beneath with hairs 1.5 mm long, as a whole moderately pubescent; cauline leaves (1–)2 (coefficient of leafiness 0.02), lanceolate, lower short-petiolate, with 3–5 teeth, acuminate, upper leaf (if present) sessile, small, entire. Inflorescence umbellate-paniculate, spreading, with 6–9 capitula; peduncles long, with occasional hairs and glands, tomentose. Involucres 11.5 mm long; involucre bracts lanceolate, subacute, to scattered, 33(25–45), pubescence with hairs 1 mm long, sparsely, 18(10–25), glandular, glands 0.4 mm long, sparsely stellate-hairy. Stigmas dark. Flowering June to July.

Deciduous and mixed forests, often together with *H. sagittatum* Lindeb.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Tomo (Tartu District). Type in Tartu.

370 **Note.** It links subsections *Bifida*, *Muroria* and *Caesia*. It is distinguished from the closely related species of cycle *Pendula* (particularly, *H. pendulum* Dahlst.) by the dark stigmas and eciliate corolla lobes.

421. **H. vagae** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 521.

Perennial. Stem 35–70 cm high, 1.5 mm in diameter, almost glabrous. Basal leaves 3–9, large, to 22 cm long, elliptical to oblong-ovate, with obtuse or truncate base or abruptly narrowed to long petiole, broad (4.3:1), with 4–7 short to spinescent teeth (at base somewhat more conspicuous), obtuse to short-acuminate, olive-green, almost glabrous above (or with occasional hairs 0.7 mm long), hairs scattered,

1 mm long along margin and beneath, densely hairy along midrib beneath, hairs 1.5 mm long, as a whole to moderately pubescent; cauline leaves 1(0–2) (coefficient of leafiness 0.02), broadly lanceolate, with truncate base, long-petiolate, acute. Inflorescence dichotomously paniculate, with 2–15 capitula; peduncles glabrous and eglandular, weakly tomentose. Involucres (9–)10–12 mm long; involucral bracts with sparse, 25(12–40), hairs 1 mm long and sparsely, 24(10–42), glandular, glands 0.5 mm long, sparsely stellate-hairy. Stigmas dark. Flowering June to July.

Forested moraines.—*European Part*: Baltic Region (Estonian SSR). Endemic? Described from Yaned (Estonian SSR). Type in Tartu.

Note. The species is close to *H. multifrons* Brenn. and is distinguished by the eglandular and glabrous peduncles.

422. ***H. pendulum*** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II (1893) 67; Norrl. in Mela-Cajander, Suom. Kasvio. 701; Zahn in Pflzr. IV, 280, 424; Joh. and Sam. Dalarn. Hier. Silvaticif. 62; Samuelsson, Maps of Scand. Hier. sp. No. 571.—*H. laceratum* Norrl. Nidr. Skand. Hier.-Fl. I (1888) 93; Mela-Cajander, Suom. Kasvio, 701, nec Jord.—**Exs.**: Dahlst. Hier. exs. fasc. I, No. 48; Herb. Hier. Scand. cent. XII, No. 39; Norrl. Hier. exs. fasc. VII, No. 84, IX, No. 78.

Perennial. Stem 20–50 cm high, 1.0–2.5 mm in diameter, dark red at base, more or less glabrous, sometimes with occasional glands and stellate hairs above. Basal leaves 2–8, outer ovate, with truncate base and retrose teeth, round-obtuse, inner elliptical, narrowly obovate to lanceolate, cuneately attenuate to winged petiole, toothed with sparse to many teeth, at base often unequally toothed to dissected-toothed, with free teeth on petiole, light grass- or glaucous-green, glaucescent beneath, (almost) glabrous above, with scattered hairs along margin and beneath 0.5–1.0 mm long, to dense hairs along midrib beneath 1.0–1.5 mm long, as a whole pubescence scattered, stellate-hairy beneath, petiole lanate; cauline leaves 0–1(–2) (coefficient of leafiness 371 0.01), linear-lanceolate, short-petiolate, acuminate, stellate-hairy beneath. Inflorescence dichotomously paniculate, with 2–8 capitula, branches slender, often drooping; peduncles with occasional hairs 0.5–1.0 mm long and occasional glands 0.3–0.4 mm long, densely tomentose. Involucres 9–11(–12) mm long; involucral bracts linear-lanceolate, narrow, dark, subobtuse to subulate, with sparse, 20(14–32), hairs 0.5–1.0 mm long and equally sparse, 16(14–27), glands 0.3 mm long, almost without stellate hairs or with sparse hairs at base, sometimes with more or less dense, stellate hairs (f. *stellatum* Juxip). Ligules (inner) ciliolate. Stigmas dull green to dark. Flowering July to August.

Dry stony slopes, in tundra along forest edge.—*European Part*: Karelia-Lapland, Dvina-Pechora (western part). *General distribution*: Scandinavia. Described from Sweden. Type in Stockholm.

423. **H. crispans** Norrl. in Mela-Cajander, Suom. Kasvio (1906) 703; Zahn in Pflzr. IV, 280, 410 (nota).—*H. crispulum* Norrl. Herb. Mus. Fenn. ed. 2 (1889) 150.—**Exs.**: Norrl. Hier. exs. fasc. VII, Nos. 82, 83.

Perennial. Stem 25–40 cm high, 1.5–2.5 mm in diameter, almost glabrous and eglandular, somewhat stellate-hairy. Basal leaves 2–4, ovate, elliptical to oblong-lanceolate, with sagittate to cordate base, long-petiolate, with 4–6 unequal, broadly triangular, straight or antrorse teeth, obtuse, subobtuse, or short-acuminate, broad (3.5:1), glaucous, glabrous above, with occasional hairs 0.6 mm long beneath, to scattered-pubescent along margin, moderately so along midrib beneath, hairs 0.6–1.0 mm long, as a whole sparsely pubescent, somewhat stellate-hairy along midrib beneath; cauline leaves 0–1(–2) (coefficient of leafiness 0.03), lanceolate, short-petiolate, with free teeth on petiole, acuminate. Inflorescence dichotomously corymbose with 4–5 capitula; peduncles with occasional hairs and occasional glands, tomentose. Involucres 10–12 mm long; involucral bracts narrow, tapering from broad base to short point, pubescence to sparse, 14(10–18), hairs 0.5 mm long, with occasional, 10(6–14) glands, 0.3–0.4 mm long, almost without stellate hairs. Stigmas dark to blackish. Flowering July to August.

Stony slopes.—*European Part*: Karelia-Lapland, Ladoga-Ilmen (northern part). *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki; paratype in Leningrad.

424. **H. petropavlovskanum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 521.

372 Perennial. Stem 40 cm high, 1.5 mm in diameter, sulcate, sparsely pubescent at base with fine, white hairs 2.5 mm long, glabrous above. Basal leaves 3, ovate to oblong-lanceolate, with truncate base, petiolate, short-acuminate, dentate with 6–9 small triangular teeth, teeth mammiform at base and partly recurved, olive-green, pale beneath, glabrous on both sides, hairs sparse along margin, 0.5 mm long, densely pubescent along midrib beneath, as a whole sparsely pubescent, somewhat stellate-hairy beneath (along midrib); cauline leaves 1 (coefficient of leafiness 0.02), lanceolate, short-petiolate, with abruptly narrowed base, serrulate, acute, sparsely stellate-hairy beneath. Inflorescence corymbose with 6 capitula; peduncles glabrous, with occasional glands 0.3 mm long (crowded near capitula), tomentose. Involucres 10 mm long; involucral bracts narrow, acute, sparse in number (24), hairs light-colored with dark base, 1 mm long, and with equally sparse (20)

glands 0.4 mm long, conspicuously stellate-hairy, with tufts. Stigmas dark. Flowering July.

Montane forests.—*European Part*: Volga-Kama (Urals) Region. Endemic. Described from vicinity of village of Petropavlovsk (central Urals). Type in Leningrad.

Note. It is distinguished from closely related species by its distinctly stellate-hairy involucre bracts.

Cycle 5. Cardiobasia Juxip.—Number of hairs and glands in inflorescence more or less equal, number of hairs on involucre bracts appreciable; coefficient of leafiness 0.03–0.01, i.e., cauline leaves 0–1(–2).

425. **H. cardiobasis** Zahn, Hier. Schweiz (1906) 252; Zahn in Pflzr. IV, 280, 421; Asch. and Graebn. Synopsis, XII, II, 639.—**Exs.**: Zahn, Hier. Europ. No. 246a.

Perennial. Stem 30–50 cm high, 1 mm in diameter, pubescence to sparse, hairs at base 2.5 mm long, 1 mm long above, with occasional glands and stellate hairs in upper part. Basal leaves 5, broadly cordate-ovate to ovate-oblong (to 11 cm long), with truncate base or abruptly narrowed to more or less long petiole (3.5:1), many-toothed (4–10), with larger, unequal, remote or even recurved teeth, toward base of lamina (sometimes with free teeth on petiole), olive-green, violet beneath, densely pubescent above with hairs 0.5 mm long, hairs scattered beneath, dense along margin 1 mm long, very dense along midrib (and petiole) beneath, 2.5 mm long, as a whole (very) densely pubescent; cauline leaves 0–1 (coefficient of leafiness 0.01), lanceolate, sharply toothed, to linear (or scarcely developed), with scattered stellate hairs beneath. Inflorescence dichotomously corymbose, with (1–)2–7 capitula; peduncles with sparse hairs 1 mm long, moderately glandular, glands 0.3 mm long, tomentose. Involucres (8–)9–10 mm long, cylindrical; involucre bracts narrow, acute, with scattered (32), dark hairs 1 mm long and sparse (22) glands 0.3 mm long, scatteredly stellate-hairy. Stigmas yellow, later turning dark. Flowering May to June.

373 Foothills and mountains, on calcareous soil.—*European Part*: Upper Dniester. *General distribution*: Central Europe, Mediterranean, Balkans-Asia Minor. Described from Switzerland. Type unknown.

426. **H. pahnschii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR; XIX (1959) 521.

Perennial. Stem 50 cm high, 2.5 mm in diameter, with occasional hairs and (in upper part) glands. Basal leaves 4–8, quite large, to 20 cm long, obovate to oblong-lanceolate, with base truncate or more or

less gradually narrowed to long petiole, broad (4:1), with 6–10 unequal, sharply serrate teeth, teeth larger toward base, with free teeth on petiole, obtuse, round, spinescent to short-acuminate or acute, grass-green, silvery-glaucous beneath, with sparse hairs 0.7 mm long above, with hairs scattered, 1 mm long beneath, dense, 0.8 mm long along margin, very dense, 1.5–2.0 mm long along midrib beneath, as a whole to densely pubescent; cauline leaves 1–2 (coefficient of leafiness 0.03), narrowly lanceolate, short-petiolate, acute, with unequal teeth, upper leaf sessile. Inflorescence open dichotomous panicle, with 7–17 capitula; peduncles with occasional hairs and scattered glands 0.3 mm long, slightly tomentose. Involucres 10 mm long; involucre bracts narrow, acute with scattered, 31(16–46), hairs 1.2 mm long and sparse, 27(26–28), glands 0.4 mm long, sparsely stellate-hairy. Stigmas dark? Flowering June to July.

Dense deciduous forests, glint slopes. A rare species.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from vicinity of Tallin (Kharku). Type in Tallin (collected by G. Pansh).

Note. It is distinguished from the closely related species *H. multifrons* Brenn. by having densely pubescent leaves with base narrowed to petiole; scattered-glandular peduncles and shorter involucres.

427. **H. multifrons** Brenn. Bidr. Finl. Hier.-form. I (1892) 121; Norrl. in Mela-Cajander, Suom. Kasvio, 701; Zahn in Pflzr. IV, 280, 418.—**Exs.:** Norrl. Hier. exs. fasc. VI, Nos. 23–26.

374 Perennial. Stem 30–60 cm high, 1.5–2.5 mm in diameter, reddish-violet at base, with occasional hairs, eglandular, slightly stellate-hairy above. Basal leaves 4–7, ovate to elliptical and broadly lanceolate, to 15 cm long (3.3:1), with cordate or truncate and somewhat sagittate base, long-petiolate, rounded-obtuse, subobtusate or extremely short-acuminate, with many (8–15) fine teeth along whole margin, teeth more conspicuous and sharp toward base, dark grass-green, violet beneath, with occasional hairs 0.6 mm long above, hairs scattered beneath, moderate along margin, 1 mm long, dense along midrib beneath, 1.5 mm long, as a whole to moderately pubescent; cauline leaves 0–1 (coefficient of leafiness 0.02), broadly lanceolate, petiolate, with truncate base, with short, linear-lobed, acute, fine teeth, acute, stellate-hairy beneath. Inflorescence dichotomously paniculate, with 4–8 capitula; peduncles with occasional hairs and occasional to sparse glands, slightly tomentose. Involucres 10–12 mm long; involucre bracts narrow, acute, pubescence to scattered, 30(23–44), hairs 1 mm long and with scattered, 25(12–36), glands 0.4 mm long, stellate-hairy

along margin of outer bracts only. Stigmas dark. Achenes 3 mm long. Flowering June to July.

Open forests on alvars (stony calcareous soil).—*European Part*: Baltic Region (Estonian SSR, western part). *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki; paratype in Leningrad.

Note. Our specimens are somewhat different from the Finnish specimens (Norrlin's *exsiccatae*) by having more densely pubescent leaves and involucre bracts, but in habit and other characters conform well with them. A rare plant, Kupffer's find on Hiiumaa (Dagö) Island remains unique to date.

Cycle 6. Oioensia Juxip.—Number of hairs on involucre bracts many times greater than number of glands; cauline leaves 2–3.

428. *H. oioëns* Dahlst. Beitr. Hier.-Fl. Oesels (1901) 26; Zahn in Pflzr. IV, 280, 430; Asch. and Graebn. Synopsis, XII, II (1935) 649.—*lc.*: Dahlst. (op. cit., t. I. fig. 2, t. II, fig. 1).

Perennial. Stem 65–70 cm high, 2 mm in diameter, dark red at base, almost glabrous and eglandular, stellate-hairy above. Basal leaves 4–5, quite large, to 20 cm long, outer leaf round or obovate, obtuse, sinuate, others ovate to broadly lanceolate, more or less abruptly narrowed to winged petiole of medium length, subobtuse to short-acuminate, all leaves broad (3.6:1), with 5–10 unequal, large (to 10 mm long) and small teeth alternating along whole margin (inner leaf at base with particularly conspicuous teeth, to 15 mm long and free teeth on petiole), glaucous, beneath paler, violet, almost glabrous and moderately pubescent only along midrib beneath with hairs 1 mm long; cauline leaves 2(–3) (coefficient of leafiness 0.03), short-petiolate or sessile, lanceolate, acute, lower leaf truncate, with 7, large, narrowly triangular or lanceolate-lobed teeth (at base to 20 mm long!), gradually reduced toward tip, upper leaf narrowly lanceolate or linear, finely toothed; leaves glabrous, sparsely stellate-hairy along midrib beneath. Inflorescence open, dichotomously paniculate, with 8–10 capitula, partly undeveloped; peduncles without simple hairs, eglandular, but densely tomentose. Involucres 11–12 mm long, ovate; involucre bracts linear, narrow (particularly, inner), acute to subulate, with sparse, 22(14–27), dark, hairs 1 mm long with light-colored cusps, and occasional, 5(2–10), glands 0.3 mm long, sparsely stellate-hairy. Stigmas dark-brown. Flowering July.

375 Meadows overgrown with shrubs and scattered trees.—*European Part*: Baltic Region (Estonian SSR, western part). Endemic. Described from Saaremaa (Oesel) Island. Type in Stockholm; cotype in Riga.

Note. A very rare plant. Dahlstedt says *H. prolixum* Norrl. is the closest species to it, which, however, is not actually true, as the latter has a large number of well-developed glands on the involuclral bracts, and the ratio of hairs of glands is 1:2, while in *H. oioënsæ* Dahlst. it is 4:1; likewise, the form of the leaves and their pubescence are also different (in general to moderately pubescent).

The larger number of cauline leaves deserves attention, as this feature brings this species closer to subsection *Caesia*.

Cycle 7. Caesiiflora Juxip.—*Grex H. bifidum* Zahn in Pflzr. IV, 280 (1929) 407.—Number of hairs on involuclral bracts many times more than number of glands; coefficient of leafiness 0.03–0.01, i.e, cauline leaves 0–1(–2); hairs on involuclral bracts sparse.

429. **H. kabanovii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 522.

Perennial. Stem 30–50 cm high, 1.5–2.0 mm in diameter, sulcate, more or less glabrous, with occasional glands above. Basal leaves 2–3, ovate to lanceolate, with base truncate to abruptly narrowed to long petiole, subobtuse to acute, with 4–5 fine, acute teeth (5:1), glabrous on both sides, with hairs along margin to scattered, 0.6 mm long, with occasional hairs along midrib beneath, as a whole pubescence very sparse (at first glance appearing glabrous), occasionally floccose beneath leaves; cauline leaves 0–1 (coefficient of leafiness 0.03), lanceolate, entire, sessile, acute, stellate-hairy beneath. Inflorescence dichotomously paniculate, with 2 capitula; peduncles sparsely pubescent with hairs 1 mm long, with occasional glands 0.3 mm long, slightly tomentose. Involucres 9.5–10.5 mm long; involuclral bracts narrow, acute, with sparse to scattered (26–28) hairs 1 mm long, and occasional (5–8) glands 0.3–0.1 mm long, without stellate hairs. Stigmas yellow. Flowering July.

Edges of montane forests.—*European Part*: Karelia-Lapland. Endemic. Described from Khibiny Mountains. Type in Kirovsk.

Note. It is distinguished from *H. oioënsæ* Dahlst. by fewer, narrower, cauline leaves and sparsely pubescent peduncles with occasional glands.

430. **H. cercidotelmatodes** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 522.

376 Perennial. Stem 60 cm high, 2 mm in diameter, with occasional hairs below, eglandular. Basal leaves 8, outer small, elliptical to lanceolate, more or less entire, inner quite long, to 20 cm long, elliptical, obovate to lanceolate, abruptly or more or less gradually narrowed to long petiole (5:1), short-acuminate to acute, with 4–8 unequal, acute teeth,

somewhat larger toward base, grass-green, with hairs to scattered, on both sides, 0.6–1.5 mm long, moderately hairy along margin, hairs 1.3 mm long, to densely pubescent along midrib beneath, hairs 1.5 mm long, as a whole to moderately pubescent; cauline leaves 1(–2) (coefficient of leafiness 0.02), lanceolate, considerably smaller than basal leaves, often bracteiform, serrulate, like basal leaves in other characters. Inflorescence open, dichotomously paniculate, with 8 capitula; peduncles without simple hairs, eglandular, tomentose. Involucres 10.5 mm long; involucral bracts narrow, acute, sparsely (20) pubescent with hairs 1 mm long and with occasional (3) glands 0.3 mm long, very sparsely stellate-hairy. Stigmas yellow. Flowering July.

Forest edges, on calcareous soil.—*European Part*: Baltic Region (Estonian SSR). Endemic? Described from Saaremaa (Oesel) Island. Type in Riga.

Note. It is distinguished from the closely related *H. stenolepis* Lindeb. by narrower leaves narrowed to petiole, denser leaf pubescence, and smaller involucres.

431. ***H. caesiiflorum*** Almqu. ex Norrl. Bidr. Skand. Hier.-Fl. I (1888) 96; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II, 50; Norrl. in Mela-Cajander, Suom. Kasvio, 699; Zahn in Pflzr. IV, 280, 411; Joh. and Sam. Dalarn. Hier. Silvaticif. 11; Dahlst. in Lindm. Svensk. Fan.-Fl. 2. ed. 614; Asch. and Graebn. Synopsis, XII, II, 615; Samuelsson, Maps of Scand. Hier. sp. No. 28.—*H. silvaticum* ssp. 5 Almqu. Stud. (1881) p. XV.—**Exs.**: Dahlst. Hier. exs. fasc. I, No. 44; Herb. Hier. Scand. cent. I, Nos. 14, 15, III, Nos. 77–79, XI, No. 9, XV, No. 26; Norrl. Hier. exs. fasc. I, No. 117, VI, Nos. 39–41; Lindb. f. Pl. Fenn. exs. 1706–1708; GRF No. 1810.

Perennial. Stem 30–55 cm high, 1.5 mm in diameter, violet at base, more or less glabrous, eglandular, sparsely stellate-hairy above. Basal leaves 3–7, ovate-rotund to ovate and oblongly ovate-lanceolate, with obtuse, cordate, or truncate base, or abruptly narrowed to long petiole, irregularly sharply toothed, teeth broadly and narrowly triangular, papillate or serrate, larger at base, with free teeth on petiole, leaves obtuse to acuminate, broad (3.5:1), grassy yellow-green, glaucescent or violet beneath, glabrous above, moderately pubescent along margin and beneath with hairs 0.3–1.0 mm long, hairs dense along midrib beneath, 1.0–1.5 mm long, as a whole moderately pubescent; petiole softly lanate; cauline leaves 0–1 (coefficient of leafiness 0.02), ovate- or triangular-lanceolate to linear, mostly small, lacinate toothed at base, acute, stellate-hairy beneath. Inflorescence dichotomously corymbose, with 2–6 capitula; peduncles with occasional hairs 1 mm long, and also occasional glands 0.2–0.4 mm long, tomentose. Involucres 9–

377 12 mm long, involucral bracts narrow, outer short and obtuse, inner

subobtuse to barely acute, sparsely, 21(14–30), pubescent with light-colored hairs with dark base, hairs 0.6–1.0 mm long, and occasional, 6(3–10), glands 0.3 mm long, sparsely to moderately stellate-hairy along margin and at base. Stigmas yellowish-green to dark. Flowering June to July. (Plate XXXIII, Fig. 2.)

Open, stony or sandy-gravelly slopes, along edges of pine and mixed forests, in birch forests on stony talus.—*European Part*: Karelia-Lapland, Ladoga-Ilmen (northern part). *General distribution*: Scandinavia, Central Europe, Balkans-Asia Minor. Described from Sweden. Type in Stockholm.

Note. A polymorphic species, quite widely distributed in Central Europe. It is distinguished from the closely related *H. stenolepis* Lindeb. by having general leaf pubescence that is twice as dense, subobtuse involucre bracts, and mostly dark stigmas.

H. vicarium Norrl. is close to *H. caesiiflorum*, which is distinguished by little else than smaller involucre (8.0–9.5 mm long).

432. ***H. stenolepis*** Lindeb. in Hartm. Handb. Skand. Fl. ed. II (1879) 45; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II, 42; Beitr. Hier.-Fl. Oesels, 24; Linton Brit. Hier. 38; Norrl. in Mela-Cajander, Suom. Kasvio, 703; Zahn in Pflzr. IV, 280, 409; Joh. and Sam. Dalarn. Hier. Silvaticif. 83; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed 614; Asch. and Graebn. Synopsis, XII, II, 609; Samuelsson, Maps of Scand. Hier. sp. No. 68.—*H. silvaticum* ssp. 1 *stenolepis* Almqu. Stud. (1881) p. XII.—*H. laetiflorum* Norrl. Bidr. Skand. Hier.-Fl. (1888) 102.—**Exs.**: Lindeb. Hier. Scand. cent. III, No. 129; Dahlst. Herb. Hier. Scand. cent. I, Nos. 1–5, II, No. 90; Norrl. Hier. exs. No. 126 (sub *H. laetiflora*).

Perennial. Stem 25–65 cm high, 1.0–2.5 mm in diameter, glabrous or with occasional hairs at base, eglandular. Basal leaves 2–8, rounded, ovate to oblong-lanceolate, sometimes large, to 22 cm long, broad (4:1), with cordate or truncate base or abruptly narrowed to long petiole, rounded-obtuse to acuminate, toothing extremely variable, either with spinescent, scarcely visible teeth (f. *integrius* Dahlst.) or with 6–8 broad, acute teeth, with lower pair often larger and recurved, making base sagittate, or (less often) teeth deeply lobed (f. *lobata* Juxip), brightly glaucous, lighter beneath or reddish-violet, glabrous above, with sparse hairs, 1 mm long beneath, hairs moderate along midrib beneath, 1.5–2.0 mm long, as a whole pubescence to scattered, petioles densely soft-pilose, sparsely stellate-hairy beneath; cauline leaves 0–1(–2) (coefficient of leafiness 0.02), lanceolate to linear, short-petiolate or sessile, in lower third of stem, at base unevenly and coarsely toothed, acute, almost entirely glabrous, but conspicuously stellate-hairy beneath. Inflorescence dichotomously paniculate, with long

- 378 branches and 2–7 capitula; peduncles with occasional hairs and occasional small glands, slightly tomentose. Involucres 11–13 mm long (in original diagnosis 10–11, in *Synopsis* (l. c.) 8–13 mm long!); involucre bracts narrow, particularly inner subulate, with colored tips, with sparse, 25(20–35), soft, dark hairs 1 mm long, and occasional, 8(2–15), glands 0.2–0.4 mm long, concentrated toward base, more or less sparsely stellate-hairy. Corollas light yellow or honey-colored. Flowering June to July.

Open coniferous forests on alvars (stony calcareous soil).—*European Part*: Baltic Region (Estonian SSR, western part). *General distribution*: Scandinavia, Balkans-Asia Minor[Balkans]. Described from Sweden. Type in Stockholm.

Note. It grows exclusively on calcareous soil. Within our floras, its range reaches the east. It is a widely distributed species in Central Europe and extremely polymorphic, mainly regarding the form and pubescence of its leaves. According to Dahlstedt (*Beitr.* l. c.), our specimens are distinguished from the Swedish plants by dark hairs on the involucre bracts and by larger glands.

433. **H. eichvaldii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 523.

Perennial. Stem 25–55 cm high, 1–2 mm in diameter, almost glabrous (with occasional hairs and glands). Basal leaves 3–8, rosulate, elliptical, obovate to lanceolate, to 23 cm long, with truncate base abruptly narrowed to long petiole, obtuse, short-acuminate to acute, at base with 1–3 coarse, triangular, papillate or lanceolate, acute teeth, beyond with 4–5 fine teeth, entire toward tip, sometimes (inner ones) with free teeth on petiole, broad (4.5:1), dark- or bluish-green, reddish-violet beneath, with scattered hairs above, 0.7 mm long, moderately hairy beneath, hairs 1 mm long, to densely hairy along margin, hairs 0.8 mm long, very densely pubescent along midrib beneath, hairs 1.5 mm long, as a whole pubescence to dense; cauline leaves 0–1(–2) (coefficient of leafiness 0.01), narrowly lanceolate (7:1), sessile, acute, often bracteiform. Inflorescence dichotomously paniculate, with 5–9 capitula; peduncles divergently upward-curved, almost glabrous and eglandular or with occasional hairs, tomentose. Involucres 8–10.5 mm long; involucre bracts narrow, acute, pubescence to scattered, 26(12–44), light-colored hairs 1 mm long and occasional, 8(3–15), glands 0.3 mm long, sparsely stellate-hairy. Stigmas dark. Flowering July.

Open forests on alvars and moraines with calcareous soil.—*European Part*: Baltic Region. Endemic. Described from Hiiumaa (Dagö) Island. Type in Tartu.

Note. It is distinguished from *H. stenolepis* Lindeb., to which it is very closely related, by dark stigmas, densely pubescent leaves, and glabrous, eglandular peduncles.

- 379 434. **H. konshakovskianum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 523.

Perennial. Stem 50 cm high, 1.5 mm in diameter, (almost) glabrous and eglandular. Basal leaves 6, rounded, obovate to lanceolate, with truncate base or abruptly narrowed to petiole, obtuse to short-acuminate, with 3–4, straight, small teeth, entire above, with sparse hairs above, 0.3 mm long, hairs scattered along margin and beneath, 0.7 mm long, dense along midrib beneath, as a whole to moderately pubescent; cauline leaves 1–2 (coefficient of leafiness 0.03), lanceolate, narrow, acuminate, mostly small, to linear. Inflorescence dichotomously corymbose, with 5 capitula; peduncles with occasional hairs 0.6 mm long and sparse, glands 0.2 mm long, slightly tomentose. Involucres 12 mm long; involucre bracts narrow, acute, pubescence to sparse, 18(15–21), with hairs 0.6 mm long and occasional (5) glands 0.2 mm long, almost without stellate-hairs. Stigmas dark. Flowering July.

Banks of mountain rivers.—*European Part*: Volga-Kama (Urals). Described from Konzhakovsky Kamen Mountain. Type in Leningrad.

Note. It is distinguished from the closely related *H. eichvaldii* Juxip by peduncles with occasional hairs, moderately pubescent leaves, and larger involucres.

435. **H. aurorinii** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 524.

Perennial. Stem 35–55 cm high, 1.5–3.5 mm in diameter, sulcate, glabrous or with occasional hairs, eglandular. Basal leaves 1–5, ovate to broadly lanceolate (4:1), with obtuse or truncate base, or abruptly narrowed to long petiole, obtuse to short-acuminate, irregularly papillose-toothed, with spinescent, to serrate teeth, with large, recurved teeth below, appearing sagittate, glaucous, violet beneath, glabrous above, with occasional hairs 0.5–1.0 mm long beneath, along margin hairs sparse, 0.8 mm long, dense along midrib, 1.0–1.5 mm long, as a whole pubescence scattered, stellate-hairy beneath along midrib; cauline leaves 0–1(–2) (coefficient of leafiness 0.02), lanceolate, short-petiolate or sessile, denticulate, at base with scattered, acute teeth, short-acuminate. Inflorescence spreading, dichotomously corymbose, with 3–9 capitula; peduncles with sparse to scattered hairs 1–2 mm long and occasional glands 0.4 mm long, tomentose. Involucres 10.0–11.5 mm long; involucre bracts narrow, subobtuse to acute, pubescence sparse to scattered, 28(20–35), hairs 1–2 mm long, with occasional, 8(4–11),

glands 0.4 mm long, without stellate hairs. Stigmas dull-greenish or dark. Achenes 3.5 mm long. Flowering July to August.

Elfin-birch woodland, on stony talus.—*European Part*: Karelia-Lapland. Endemic. Described from Khibiny Mountains. Type in Kirovsk.

380 **Note.** It is distinguished from the closely related *H. eichvaldii* Juxip by scatteredly pubescent peduncles and leaves.

436. **H. chlorellum** Sael. and Norrl. Bidr. Scand. Hier.-Fl. I (1888) 47; Herb. Mus. Fenn. ed. 2, 151; in Mela-Cajander; Suom. Kasvio, 698; Zahn in Pflzr. IV, 280, 391; Joh. and Sam. Dalarn. Hier. Silvaticif. 16; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 616; Asch. and Graebn. Synopsis, XII, II, 478; Samuelsson, Maps of Scand. Hier. sp. No. 30.—*H. latilobatum* Almqu. apud Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II (1893) 166.—**Exs.**: Dahlst. Hier. exs. fasc. II, No. 27; Herb. Hier. Scand. cent. I, Nos. 91, 92, V, Nos. 19, 20, XI, No. 13, XIX, No. 30; Norrl. Hier. exs. fasc. VI, Nos. 14–19, VII, No. 81; Zahn, Hier. Europ. No. 452.

Perennial. Stem 20–70 cm high, 1.0–3.5 mm in diameter, violet at base, sulcate, more or less glabrous, sometimes with occasional glands and sparse stellate hairs above. Basal leaves 4(1–6), outer ovate-rounded or cordate, with obtuse or truncate base, obtuse, inner leaves often large, to 20 cm long, oblong-ovate to ovate-lanceolate, broad (2–4:1), with truncate base, long-petiolate, with 5–8 broadly triangular teeth, at base teeth deeply dissected-lobed, recurved (leaves sagittate), with isolated teeth on petiole, subobtuse, dark glaucous, sometimes spotted, paler beneath, glabrous above, with occasional to sparse hairs beneath, with scattered hairs 1 mm long along margin, moderately (to densely) pubescent beneath along midrib with hairs 1–2 mm long, as a whole sparsely pubescent, somewhat stellate-hairy along midrib beneath; cauline leaves 0–1(–3) (coefficient of leafiness 0.02–0.08), short-petiolate, broadly ovate-lanceolate, with truncate or sagittate base, with remote angular teeth, mucronate, often small. Inflorescence dichotomously corymbose, with 2–10 capitula; peduncles with occasional hairs (or glabrous) 1 mm long, and occasional glands, 0.3 mm long, tomentose. Involucres 9.5–11.5 mm long (*Synopsis*, (l. c.) indicates just 8–9 mm); involucre bracts somewhat broad, triangular-attenuate from broad base, subobtuse, with sparse, 20(10–30), dark hairs 1 mm long, and occasional, 10(5–11), fine glands 0.2–0.5 mm long or with occasional, 8(4–12), hairs and sparse, 19(14–26), glands 0.5 mm long (var. *gubanovianum* Juxip), very densely stellate-hairy to apical tuft. Stigmas dull-yellow to dark. Flowering June to August.

Forest edges, meadows overgrown with shrubs.—*European Part*: Karelia-Lapland, Ladoga-Ilmen, Dvina-Pechora (western part). *General*

distribution: Scandinavia, Central Europe. Described from Sweden. Type in Helsinki.

Note. Apparently, *H. sagittipotens* Norrl., from the Lake Ladoga area, is also related to this species (Mela-Cajander, *Suom. Kasvio*, 699; Zahn in *Pflzr.* l. c.).

437. **H. canitosum** Dahlst. in Bot. notiser (1892) 155; Bidr. Sydöstr. Sverig. Hier.-Fl. II (1893) 47; Zahn in *Pflzr.* IV, 280, 410; Asch. and 381 Graebn. Synopsis, XII, II, 612; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 614, non Brenn.—*H. silvaticum* L. ssp. *i silvaticum* var. 1 Almqu. Stud. (1881) p. XIII.—*H. subcaesium* var. *abrasum* G. Beck Fl. N.-Oesterr. (1893) 1299.—*H. velecese* Rehm. and Baenitz. in Allgem. Bot. Zeitschr. (1899) 22.—**Exs.**: Dahlst. Hier. exs. fasc. I, No. 41; Baenitz, Herb. Europ. No. 10344.

Perennial. Stem 30–40 cm high, 1.0–1.5 mm in diameter, almost glabrous, reddish at base, above stellate-hairy. Basal leaves 5–8, ovate to lanceolate, with truncate, less often sagittate base, long-petiolate, to 16 cm long, broad (4.5:1), more or less coarsely toothed at base, sometimes with paired retrorse teeth, with unequal, more or less long and acute teeth to middle of lamina, sometimes with free teeth on petiole, subobtusate to long-acuminate, light glaucescent-green, reddish-violet beneath, on both sides (almost) glabrous, along margin with sparse hairs 0.5 mm long, hairs to moderate beneath along midrib, 1.5 mm long, as a whole sparsely pubescent, stellate-hairy beneath; cauline leaves 0–1 (coefficient of leafiness 0.01), lanceolate or ovate-lanceolate, long-acuminate, sagittately lacerately toothed. Inflorescence open, dichotomously paniculate, with 2–4 capitula, peduncles with occasional hairs and glands, densely white-tomentose. Involucres 11–13 mm long (9–10 mm in original diagnosis of Dahlstedt); involucre bracts lanceolate, narrow, acute, with sparse, 27(22–33), light-colored, hairs 1 mm long, and occasional, 10(6–15), glands 0.2–0.5 mm long, very densely white-stellate hairy. Stigmas dull-green, later turning dark. Corollas light yellow. Flowering June to July.

Forested slopes of moraines.—*European Part*: Baltic Region. *General distribution*: Scandinavia, Central Europe, Balkans-Asia Minor (western part). Described from Sweden. Type in Stockholm.

Note. The northeastern limit of its distribution lies in the western part of the Baltic Region. It is distinguished from the closely related species *H. stenolepis* Lindeb. primarily by the stellate hairs of the involucre bracts, dark stigmas, and less deeply incised leaves.

438. **H. sublividum** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II (1893) 49; Zahn in *Pflzr.* IV, 280, 410.—**Exs.**: Dahlst. Hier. exs. fasc. I (1889) No. 42.

Perennial. Stem 25–65 cm high, 1.0–2.5 mm in diameter, violet at base, almost glabrous and eglandular, slightly stellate-hairy above. Basal leaves 2–7, obovate to ovate or lanceolate, to 13 cm long, broad (3.6:1), with truncate base or more or less abruptly narrowed to long petiole, obtuse or short-acuminate, at base with 1–2 pairs of more or less conspicuous teeth, closer to tip with short to tiny teeth, very rarely with large (to 20 mm long) teeth, leaves at base with deeply, 382 lacerately lobed (to 20 mm long), narrow and acute teeth (f. *pajakense* Juxip), dark glaucous, violet beneath, almost glabrous above, moderately pubescent beneath and along margin with hairs 1.3–0.7 mm long, very densely hairy along midrib beneath, hairs 1.5–2.0 mm long, as a whole pubescence to moderate, stellate-hairy beneath along midrib; cauline leaves 0–1(–2) (coefficient of leafiness 0.02), lanceolate, broad (4:1), with truncate base, long-petiolate and acuminate, dentate or with 3–4 quite long (to 25 mm), unequal teeth, and long-acuminate tip (f. *pajakense* Juxip). Inflorescence open, dichotomously paniculate, with 4–9 capitula; peduncles without simple hairs and eglandular or with occasional glands, tomentose. Involucres (9–)10–12 mm long, ovate, involucre bracts lanceolate, subobtusate to acute, with sparse, 22(18–27), hairs 1 mm long and occasional, 6(0–13), glands 0.3 mm long, very densely stellate-hairy along margin. Stigmas more or less dark (dull brown). Flowering June to July.

Open deciduous and mixed forests on alvars and slopes of moraines, in shrubby meadows, preferably on calcareous soil.—*European Part*: Baltic Region (Estonian SSR). *General distribution*: Scandinavia. Described from Sweden. Type in Stockholm; type of form in Tallin.

Cycle 8. Albidula Juxip.—Number of hairs on involucre bracts many times more than number of glands; hairs in considerable number (scattered); cauline leaves 1–2(–3).

439. *H. cauri* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 524.—*H. estonicum* Dahlst. in sched.

Perennial. Stem 40–65 cm high, 1.5–2.0 mm in diameter, below with sparse hairs 1–3 mm long, eglandular. Basal leaves 2–4, elliptical to oblong-ovate, with truncate base, long-petiolate, acuminate, remotely 4–5-toothed, lower 2–3 teeth coarse, broadly triangular, acute, leaves glaucous, reddish-violet beneath, to 17 cm long (4.5:1), glabrous above, sparse hairs beneath 1 mm long, hairs scattered along margin, 0.7 mm long hairs, dense along midrib beneath, 1.5 mm long, as a whole pubescence scattered; cauline leaves 1–3 (coefficient of leafiness 0.04), ovate-lanceolate, subsessile, resembling inner basal leaves.

Inflorescence dichotomously paniculate, with 5–7 capitula; peduncles with occasional hairs and glands or glabrous and eglandular, weakly tomentose. Involucres (7.5–)9.5–11.0 mm long; involucral bracts narrow, subacute, scatteredly, 35(25–50), pubescent with hairs 1 mm long and with occasional, 3(0–6), glands 0.2–0.3 mm long at base of bracts, or eglandular, sparsely stellate-hairy. Stigmas greenish. Flowering July.

Open pine forests on alvars (stony calcareous soil).—*European Part*: Baltic Region (Estonian SSR, northwestern part). Endemic. Described from Hiiumaa (Dagö) Island. Type in Riga.

- 383 **Note.** The plant collected by K. Kupffer was named *H. estonicum* Dahlst. (nomen) by Dahlsted. As the description had remained unpublished and the plant was adapted both geographically and ecologically to a very restricted habitat, we did not think it appropriate to retain Dahlsted's name, because it gives the impression of something typical for all of Estonia, which is not at all true. This same species was found by us in the vicinity of Khapsalu (Gapsal) under identical ecological conditions.

440. **H. albidulum** Stenstr. Värml. Arch. (1889) 18; Zahn in Pflzr. IV, 280, 412; Asch. and Graebn. Synopsis, XII, II, 627 (em. Juxip).

Perennial. Stem 30–65 cm high, 1.5–3.0 mm in diameter, with occasional hairs at base, eglandular, stellate-hairy. Basal leaves 3–6, elliptical to ovate and broadly lanceolate, obtuse or short-acuminate, with truncate base, long-petiolate, with 10–13 coarse (particularly at base), unequal, triangular, papillate and sharply serrate teeth (lower teeth often recurved), olive-green, violet beneath, hairs sparse above, 0.5 mm long, hairs dense beneath and along margin, 0.7–1.0 mm long, very dense along midrib beneath, 2 mm long, as a whole pubescence to dense; cauline leaves 1 (coefficient of leafiness 0.02), obliquely lanceolate, petiolate, unequally toothed. Inflorescence open, dichotomously paniculate, with 4–12 capitula; peduncles long, with occasional (to sparse) hairs, eglandular or with occasional glands, gray-tomentose. Involucres 10.5–12.5 mm long; involucral bracts narrow, subobtusate to acute, weakly barbate, hairs from scattered to moderate, 40(25–60), 0.8 mm long, and occasional, 14(10–18), glands 1.3 mm long, densely (whitish) stellate-hairy. Stigmas yellow, later turning brown. Flowering June to July.

Dry pine and spruce forests on alvars and moraines.—*European Part*: Baltic Region (Estonian SSR). *General distribution*: Scandinavia. Described from Sweden. Type in Stockholm.

441. **H. agnostum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 525.

Perennial. Stem 45–80 cm high, 3.5 mm in diameter, with quite long branches (from axils of all cauline leaves), scattered-pubescent, with occasional glands above. Basal leaves 6–9, ovate to lanceolate, with truncate base or abruptly narrowed to long petiole, to 23 cm long, broad (3.5:1), with quite unequal teeth, at base coarse, triangular, papillate, or lanceolate, in upper half denticulate or more or less entire, sometimes with free teeth on the petiole, dark green, with scattered hairs above 0.5 mm long, densely pubescent beneath and along midrib, hairs 2.0–2.5 mm long, 0.5 mm long along margin, as a whole densely
 384 pubescent; cauline leaves 1–2 (coefficient of leafiness 0.02), lanceolate, short-petiolate to sessile; unequally coarsely toothed, acute, smaller than basal leaves, often bracteiform. Inflorescence spreading umbellate panicle with 6–30 capitula; peduncles sparsely pubescent, to moderately glandular, weakly tomentose. Involucres 9 mm long; involucre bracts lanceolate, acute, with scattered, 43(24–60), hairs 1 mm long, and sparse, 17(13–20), glands 0.4 mm long, sparsely stellate-hairy along margin. Stigmas dark. Flowering July.

Mixed spruce forests on neutral soil.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Kyarde (Tartu District). Type in Tartu.

Note. It links subsections *Bifida* and *Muroria*. It is distinguished from the closely related *H. albidulum* by dark stigmas, smaller involucres, and scattered-pubescent and sparsely glandular peduncles.

Subsection 8. *Sagittata* Juxip.—Zahn in Engl. Pflzr. IV, 280 (1921) 342 (ut sp. coll.); Zahn in Asch. and Graebn. Synopsis, XII, II (1931) 362 (1934) 484 (sub sp. coll.).—Characters in key. Coefficient of leafiness 0.03(0.02–0.05), i.e., cauline leaves 1–2; basal leaves 2 to 12, i.e., rosette usually well-developed; inflorescence paniculate-corymbose; candelabrum-like; involucre bracts conspicuously pubescent and also with sparse to scattered, small, fine, partly undeveloped glands concealed under dense pubescence in the ratio of 70:30 (from 90:10 to 60:40); leaves very densely pubescent (most conspicuous feature together with distinct vestiture of involucre bracts); approximately 20% of examined specimens had more or less developed pollen.

In its characters, subsection *Sagittata* lies between subsections *Diaphanoidea* and *Muroria* on the one hand and between *Caesia* and *Bifida* on the other.

Of great interest is the comparatively small “island” range of the species of this subsection, which is bounded by a line encircling most of Iceland, Norway, Sweden, and Finland, the northwestern part of the European Territory of the Soviet Union, part of Poland, the northeastern part of Denmark, Scotland and the northeastern part of Ireland, with its center approximately in central Norway.

1. Leaves pubescent on both sides.....2.
- + Leaves glabrous above, but as a whole (beneath and along margin) densely pubescent.....442. **H. segevoldense** Syr. and Zahn
2. Involucral bracts (and peduncles) with occasional glands.....3.
- + Involucral bracts (and peduncles) with sparse to scattered glands.....5.
3. Basal leaves gradually narrowed to petiole.....443. **H. lippmae** Juxip
- 385 + Basal leaves abruptly narrowed to petiole or lamina base truncate.....4.
4. Leaves densely pubescent above; peduncles more or less glabrous; stigmas dull-green.....444. **H. lackschewitzii** Dahlst.
- + Leaves very densely pubescent above (and as a whole) (two times denser than previous species); peduncles sparsely pubescent; stigmas yellow.....445. **H. acrogymnon** Malme.
- 5 (2). Base of lamina gradually narrowed to petiole.....6.
- + Base of lamina abruptly narrowed to petiole or truncate.....7.
6. Involucres long (11 mm long).....446. **H. malmei** Dahlst.
- + Involucres short (8.5–10.0 mm long)...447. **H. philanthrax** Stenstr.
7. Leaves as a whole very densely pubescent.....448. **H. sagittatum** Lindeb.
- + Leaves as a whole densely pubescent (thus distinguished by this character from other species of subsection, leaves quite broad (3:1).....449. **H. ugandiense** Juxip

Cycle 1. Marginella Juxip.—Subgex *H. marginellum* Zahn in Pflzr. IV, 280 (1921) 344.—Leaves glabrous above, although as a whole densely pubescent.

442. **H. segevoldense** Syr. and Zahn in Zahn Sched. ad Hier. Europe. VII (1913) 15; in Pflzr. IV, 280, 345; Asch. and Graebn. Synopsis, XII, II, 485.—Exs.: Zahn, Hier. Europ. No. 752.

Perennial. Stem 40–60 cm high, 1.5 mm in diameter, scattered pubescent with hairs 1.0–2.5 mm long, eglandular. Basal leaves 3, quite large, obovate or ovate-oblong, elliptical to lanceolate, broad (3.5:1), abruptly narrowed to long petiole, obtuse or somewhat acuminate, irregularly and very often broadly and coarsely toothed, olive (grass)-green, violet beneath, glabrous above, sparse hairs beneath 1 mm long, hairs scattered along margin, 1 mm long, very dense along midrib beneath, 2 mm long, as a whole very densely pubescent, petiole lanate with soft, hairs 2.0–2.5 mm long; cauline leaves 1–2 (coefficient of leafiness 0.03), ovate-lanceolate, with many coarse teeth, short petiolate, or upper leaf sessile, acute. Inflorescence umbellate-

paniculate, with 4–5 capitula; peduncles sparsely pubescent, with occasional glands, tomentose. Involucres 10.5 mm long; involucre bracts lanceolate, somewhat broad, obtuse to subacute, moderately, 50(40–55), pubescent with hairs 1.2 mm long and sparsely, 17(12–30), glandular, glands 0.3 mm long, moderately stellate-hairy (more dense along margin). Stigmas dark. Flowering June to July.

Forested hill slopes.—*European Part*: Baltic Region. Endemic. Described form Sigulda (Zegevolod) near Riga (Latvian SSR). Type in Riga?

Cycle 2. Sarcophylla Juxip.—Subgrex *H. sarcophyllum* (Dahlst.) Zahn in Pflzr. IV, 280 (1921) 347.—Involucral bracts (and peduncles) with occasional glands; leaves densely pubescent on both sides.

443. *H. lippmae* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 525.

Perennial. Stem 25–60 cm high, 1.0–2.5 mm in diameter, sparsely pubescent with hairs 1.5 mm long, eglandular (or with occasional glands below inflorescence). Basal leaves 2–6, elliptical to lanceolate, more or less abruptly or gradually narrowed to long petiole, acuminate, with 4–7, more or less broad, small and unequal or very small teeth, to 17 cm long (4.5:1), hairs moderate above, 0.8 mm long, very dense along margin and midrib beneath, 1.0–1.5 mm long, as a whole very densely pubescent; cauline leaves 1(–2) (coefficient of leafiness 0.02), lanceolate, short-petiolate, resembling inner basal leaves, acute. Inflorescence a corymb, with 2–9 capitula; peduncles sparsely pubescent and glandular, weakly tomentose. Involucres 8.5–9.5 mm long; involucre bracts lanceolate, subacute, with scattered, 30(20–40), hairs 1 mm long, with occasional glands 0.3 mm long, sparse stellate-hairy along margin. Stigmas dark brown. Flowering June to July.

Deciduous and mixed forests.—*European Part*: Baltic Region (Estonian SSR), Upper Volga. Described from Yaned (Estonian SSR). Type in Tartu.

Note. The species approaches *H. lackschewitzii* Dahlst. and *H. acrogymnon* Malme, but is distinguished from them by leaves that narrow to a petiole (like *H. philanthrax* Stenstr., which it resembles in habit) and involucre bracts and peduncles with occasional glands.

444. *H. lackschewitzii* Dahlst. Beitr. Fl. Oesels (1901) 27; Zahn in Pflzr. IV, 280, 345; Asch. and Graebn. Synopsis, XII, II, 485.

Perennial. Stem 45–55 cm high, 1.5 mm in diameter, glabrous or with occasional hairs, eglandular, sparsely stellate-hairy above, often with lateral stems. Basal leaves 9–10, ovate, oblong-ovate to ovate-lanceolate, with truncate or sagittate base, long-petiolate, acuminate,



to 20 cm long (4.5.1), with 7–10 unequal, broad, acute teeth, with
 389 somewhat coarser (to incised and lobed), slightly retrorse teeth at base
 and with free teeth on petiole, olive-green, paler beneath, with dense
 hairs 0.4–0.8 mm long on both sides and equally dense along margin,
 1 mm long, and very dense beneath along midrib, 1.0–1.5 mm long, as
 a whole very densely pubescent; cauline leaves 1–2 (coefficient of
 leafiness 0.03), lanceolate, lower leaf long-petiolate, upper narrowed to
 sessile, cuneate base, with acute teeth, at base unequally acute-lobed.
 Inflorescence open, dichotomously paniculate, with 3–7 capitula; pe-
 duncles more or less glabrous and eglandular, densely white-tomen-
 tose. Involucres 8–10 mm long; involucre bracts somewhat broad,
 acute, with scattered (30) hairs 1 mm long, with occasional (5) glands
 0.2 mm long, sparsely stellate-hairy. Stigmas dull green, later turning
 dark. Flowering June to July.

Forested slopes of moraines.—*European Part*: Baltic Region
 (Estonian SSR). Endemic. Described from Saaremaa (Oesel) Island. Type
 in Stockholm; cotype in Riga.

445. **H. acrogymnon** Malme in Bot. Notis. (1891) 178; Zahn in Pflzr.
 IV, 280, 349.—*Exs.*: Dahlst. Hier. Scand. exs. I, No. 98.

Perennial. Stem 30–50 cm high, 2 mm in diameter, with scattered
 hairs 1.5 mm long, with occasional glands above or eglandular. Basal
 leaves 4–10, ovate and elliptical to lanceolate, broad (3.7:1), with
 rounded or truncate base, long-petiolate, with 2–7, remote, broad,
 acute or obtuse, papillate, spinescent teeth, at base with 2 larger teeth,
 and with free teeth on petiole, olive-green, on both sides and as a
 whole strongly densely pubescent (denser than all species of this, in
 general, densely pubescent subsection), hairs 0.8–2.0 mm long; cauline
 leaves (0–)1–2(–3) (coefficient of leafiness 0.04), lanceolate, short-
 petiolate to sessile, resembling basal leaves, acuminate. Inflorescence
 corymbose panicle, with 3–12 capitula; peduncles sparsely pubescent,
 with occasional fine glands, weakly tomentose. Involucres
 8.5–10.0 mm long; involucre bracts linear, abruptly triangular-acumi-
 nate, with scattered to moderate, 43(20–65), hairs 1 mm long and with
 occasional, 4(2–6), fine glands 0.2 mm long, sparsely stellate-hairy.
 Stigmas yellow. Flowering June to July.

Meadows overgrown with shrubs, along edges of open forests on
 stony soil.—*European Part*: Baltic Region. *General distribution*:
 Scandinavia, Atlantic Europe. Described from Sweden. Type in
 Stockholm.

Cycle 3. Sagittate.—Subgex *H. sagittatum* Zahn in Pflzr. IV, 280
 (1921) 342.—Involucre bracts with sparse to scattered glands; leaves
 densely pubescent on both sides.

446. **H. malmei** Dahlst. apud Wiinst. in Raunk. Exs.-Fl. (1923) 315; Asch. and Graebn. Synopsis, XII, II, 472.

390 Perennial. Stem 40 cm high, 1.5 mm in diameter, moderately pubescent with hairs 2 mm long, with occasional glands above. Basal leaves to 10, elliptical, cordate to lanceolate, broad, to 13 cm long (4.3:1), with obtuse, cordate, or truncate base, quite long-petiolate, with 2–7 broad, acute teeth, at base to deeply incised, obtuse or short-acuminate, moderately pubescent above, with hairs 0.6 mm long, densely hairy beneath and along margin, hairs with 1 mm long, extremely dense pubescence beneath along midrib and on petiole, hairs 2 mm long, as a whole very densely pubescent; cauline leaves 2 (coefficient of leafiness 0.05), lanceolate, short-petiolate to sessile, resembling inner basal leaves. Inflorescence corymbose, with 6–10 capitula; peduncles with scattered pubescence, with occasional glands, tomentose. Involucres 11 mm long; involucre bracts linear, subacute, with moderate (50) hairs 1.2 mm long and sparsely (20) fine-glandular, more or less without stellate hairs. Stigmas yellowish-brown. Flowering June to July.

European Part: Baltic Region. Endemic. Described from Latvian SSR. Type in Riga.

447. **H. philanthrax** Stenstr. Värml. Arch. (1889) 25; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II, 187; Williams, Prodr. 139; Norrl. in Mela-Cajander, Suom. Kasvio, 697 (var. *olivascens* Norrl.); Zahn in Pflzr. IV, 280, 343; Joh. and Sam. Dalarn. Hier. Silvaticif. 66; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 616; Asch. and Graebn. Synopsis, XII, II, 485; Samuelsson, Maps of Scand. Hier. sp. No. 60.—*H. sagittatum* (Lindeb.) var. Norrl. Bidr. Skand. Hier.-Fl. I (1888) 89.—*H. silvaticum* L. ssp. 11 *pellucidum* Laest. var. 4 Almqu. Stud. (1881), p. XX.—*Exs.*: Norrl. Hier. exs. No. 105; Hier. exs. fasc. V, Nos. 97–99, IX, Nos. 69, 70; Dahlst. Hier. Scand. cent. I, Nos. 79–84, V, 45; GRF No. 775 p. p.

Perennial. Stem 40–70 cm high, 1–4 mm in diameter, with sparse to more or less dense hairs 1–3 mm long and with occasional to scattered glands above. Basal leaves 6(3–12), obovate, elliptical to lanceolate, to 22 cm long, somewhat broad (4.5:1) (lamina gradually narrowed to long petiole), denticulate, obtuse to short-acuminate, glaucous-green, paler beneath, pubescence moderate above, hairs 0.7 mm long, very dense beneath and along margin, hairs 1 mm long, extremely dense pubescence beneath along midrib and on petiole, hairs 1.5–2.5 mm long, as a whole very densely pubescent; cauline leaves (0–)1–2(–3) (coefficient of leafiness 0.03), oblong-lanceolate, petiolate, acute, pubescence as on basal leaves (sometimes even denser). Inflorescence corymbose panicle, with 3–20(–30) capitula; peduncles sparsely pubescent, with scattered glands, tomentose. Involucres 8.5–10.0 mm

long; involuclral bracts linear, dark green, triangular-acuminate, with scattered (from sparse to moderate), 40(25–65), hairs 1 mm long, and equally scattered, 30(15–50), fine glands 0.3 mm long, sparsely stellate-hairy along margin. Stigmas dark. Flowering June to July.

391 Open coniferous and mixed forests on alvars, forested slopes of moraines, meadows overgrown with shrubs.—*European Part*: Karelia-Lapland, Dvina-Pechora (western part), Ladoga-Ilmen, Baltic Region. *General distribution*: Scandinavia, Atlantic Europe. Described from Sweden. Type in Stockholm.

Note. Var. *olivascens* Norrl. (l. c.) also belongs here. It is distinguished by the involuclral bracts that are stellate-hairy over the whole margin.

The leaves of plants growing in the sun are often spotted.

448. **H. sagittatum** Lindeb. in Hartm. Handb. Scand. Fl. ed. 11 (1879) 43, pro *H. murorum* L. *δ. sagittatum* Lindeb.: Värml. Arch. (1889) 11; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. II, 192; Linton, Brit. Hier. (1905) 52; Norrl. in Mela-Cajander, Suom. Kasvio, 696; Zahn in Fedtch. and Flerov, Fl. Evrop. Ross. 1097; Zahn in Pflzr. IV, 280, 343; Joh. and Sam. Dalarn. Hier. Silvaticif. 80; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 615; Ganeschin in Maevsk. Fl. 8 ed. 646; Samuelsson, Maps of Scand. Hier. sp. No 66.—*H. eu-sagittatum* (Lindeb.) Zahn in Asch. and Graebn. Synopsis, XII, II (1934) 484.—*H. murorum* L. *δ. incanum* Lindeb. in Blytt. Norg. Fl. II (1874) 653.—*H. silvaticum* L. ssp. 12 Almqu. Stud. (1881) p. XXI.—**Exs.**: Lindeb. Hier. Scand. exs. No. 58; Dahlst. Hier. exs. fasc. III, No. 42; Herb. Hier. Scand. I, Nos. 88–90; XI, No. 44; GRF Nos. 1834, 1835, sub *H. pseudopleiophyllum* Zahn pro ssp.

Perennial. Stem 25–75 cm high, 1.5–3.5 mm in diameter, reddish-violet at base, sparsely to densely pubescent below with hairs 2 mm long, above with occasional to sparse glands and stellate hairs. Basal leaves 7(3–12), ovate to ovate-lanceolate, to 23 cm long, broad (4:1) (inner leaves narrower), truncate or abruptly narrowed to long petiole at base, obtuse to subacute, bluntly or sharply toothed, at base more conspicuously toothed, to almost lobed, with free teeth on petiole (however, sometimes more or less entire), light or dark grass-green, paler beneath, densely pubescent above with hairs 0.7 mm long, very densely so along margin and beneath with hairs 1 mm long, hairs along midrib beneath and on petiole extremely dense, 2.0–2.5 mm long, as a whole very densely pubescent; cauline leaves 1–2 (coefficient of leafiness 0.03), ovate to lanceolate, sagittate at base, margins to almost entire, resembling inner basal leaves. Inflorescence corymbose panicle, with upward-directed branches and 10(3–18)34 capitula; peduncles sparsely pubescent with scattered with fine glands,

tomentose. Involucres (8-)10-12 mm long, ovate or cylindrical; involu-
 cral bracts narrow, linear to lanceolate, subobtusate to acute, with scat-
 tered to moderate, 43(25-65), hairs 0.5-1.5 mm long, light-colored with
 dark base, and from sparse (ssp. *pseudopleiophyllum* Zahn) to mod-
 erate, 28(15-55), fine glands 0.3-0.4 mm long, with sparse stellate hairs
 (mainly along margin, but sometimes denser, giving bracts appearance
 392 of being variegated). Ligules of central florets sometimes somewhat
 ciliate. Stigmas dark or blackish. Flowering June to July.

Spruce and mixed forests, on neutral soils and on calcareous
 bluffs, in open forests on alvars, less often on sandy soil.—*European*
Part: Karelia-Lapland, Dvina-Pechora (western part), Baltic Region;
 Ladoga-Ilmen, Upper Volga. *General distribution*: Scandinavia, Cen-
 tral Europe (Poland), Atlantic Europe (Scotland), Iceland. Described
 from Norway, Type in Stockholm.

Note. Of all the species of section *Vulgata*, *H. sagittatum* Lindeb.
 is the most often infected by the fungus *Puccinia hieracii* (Schum.)
 Mart. Galls developing from insect bites and pricks are also commonly
 observed on the involu-
 cral bracts and peduncles.

Along with densely pubescent specimens, we also find plants with
 considerably less dense pubescence (although, in general, still densely
 pubescent); apparently, these are plants growing in shade, which
 usually have less dense pubescence and thinner, tender, and soft
 leaves.

449. **H. ugandiense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk
 SSSR, XIX (1959) 526.

Perennial. Stem 45-60 cm high, 2 mm in diameter, with scattered
 hairs 2 mm long, sparsely glandular above. Basal leaves 2-7, ovate,
 obovate to broadly lanceolate, with truncate to sagittate base and
 long, winged petiole, quite large, to 20 cm long, broad (3:1), obtuse to
 subacute, with 5-8 wide, short teeth, at base with 1-2 pairs of larger,
 more or less lobed teeth, with free teeth on petiole, grass-green, lead-
 gray beneath, with sparse hairs 0.6 mm long above, with scattered to
 dense hairs along margin, 0.7-0.8 mm long, hairs very dense along
 midrib beneath, 2 mm long, as a whole pubescence to dense (in this
 character, differs from other species of the subsection); cauline leaves
 (0-)1(-2) (coefficient of leafiness 0.02), lanceolate, short-petiolate, with
 sagittate base, with large, unequal teeth, acute, recurved. Inflorescence
 dichotomously corymbose, with 2-6 capitula; peduncles sparsely
 pubescent, with scattered glands, weakly tomentose. Involucres 10-11
 mm long; involu-
 cral bracts lanceolate, subacute, with scattered, 34(25-
 50), hairs, 1.2 mm long, sparsely, 26(15-35), glandular, glands 0.4 mm
 long, without stellate hairs. Stigmas dark. Flowering June to July.

Deciduous and mixed forests, on neutral soil.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Konguta (Tartu District). Type in Tartu.

Note. It differs from all other species of *Sagittata* by the pubescence of the leaves—only to dense (i.e., not typical for the subsection).

- Section 14. *Villosa* Gris.** Comm. (1852) 65 p. p.; Fr. Epicr. 61 p. p.;
 393 Zahn in Koch, Synopsis, 3, III, 1766; Zahn in Pflzr. IV, 280, 81; Asch. and Graebn. Synopsis, XII, II, 86.—*Stirps H. villosi* Fr. Symb. (1848) 47 p. p.; Epicr. 61 p. p.—*Villosina* N.P. Hier.-Mitteleur. II (1886) 85.—Dwarf plants (very rarely more than 30 cm high), densely lanate from long, soft hairs; leaves lanceolate or oblong, glaucous, with latex, densely pubescent (less often pubescence sparse—in forms transitional to other sections); cauline leaves sessile, with broad or somewhat amplexicaul base; inflorescence dichotomously branched, unicapitulate or with few capitula, involucre very large (14–17 mm long); involucre bracts very broad, outer almost always widely spaced, bracteiform, acute, inner narrower, acuminate, without stellate hairs; entirely eglandular or with solitary fine glands on tips of inner involucre bracts.

The range of the species of this section is similar to that of section *Glauca*. They grow in the European Alps (in a broad sense). Being calciphiles, they are found in calcareous mountains and foothills. They are often found in the Carpathian Mountains.

1. Involucre bracts spreading, with dense white hairs 3–5 mm long; involucre 14–18 mm long; coefficient of leafiness 0.20, i.e., cauline leaves 4–8; basal leaves attenuate to winged base, more or less entire, mostly very densely covered with long (to 8 mm) hairs.....450. ***H. villosum* Jacq.**
- + Involucre bracts crowded, densely covered with hairs 1–3 mm long; involucre 12–16 mm long; coefficient of leafiness 0.09, i.e., cauline leaves 2–5; basal leaves more or less petiolate, mostly sinuately serrate, to densely covered with hairs 1–3 mm long.....451. ***H. dentatum* Hoppe**

450. ***H. villosum* Jacq.** Enum. Vindob. (1762) 142, 271 p. p.; Fl. Austr. I, t. 87; L. Sp. pl. ed. 2, 1130; Froel. in DC. Prodr. VII, 228; Fr. Symb. 50; Epicr. 64; N.P. Hier. Mitteleur. II, 89; Zahn in Pflzr. IV, 280, 82; in Hegi, Ill. Fl. VI, 2, 1252; Asch. and Graebn. Synopsis, XII, II, 86.—*H. floccosum* Schur. in Öster. Bot. Zeitschr. VIII (1858) 22; Enum. Transs. 388.—*H. baumgartenianum* Schur. Sert. (1853) No. 1760.—**lc.:**

Rchb. Ic. XIX, 96, t. 200, fig. I, II; Hegi (l. c.) fig. 890.—**Exs.:** Zahn, Hier. Europ. Nos. 29–31, 144, 443, 551, 552; Hier. Naeg. Nos. 344–346; Fl. exs. A.–H. No. 3324.

394 Perennial. Stem 10–30(40) cm high, somewhat thick, flexuous, densely covered with white, soft hairs 4–10 mm long, eglandular, densely stellate-hairy only above. Basal leaves few (0–6), attenuate base, oblong to lanceolate, subobtuse to acute, entire, or short-toothed, often sinuate, mostly glaucous, often reddish-violet, with abundant latex, with dense to very dense, soft, white hairs to 8 mm long or to scattered-hairy (var. *calvifolium* N.P.), particularly beneath (but in typical plants also above), without stellate hairs, and eglandular; cauline leaves (3–)4–8 (rarely to 10) (average coefficient of leafiness 0.20), sessile, lower leaves with narrow base, others broader and with rounded or weakly amplexicaul base, gradually transitional to floral bracts and involucre bracts, upper leaves sometimes with occasional fine glands along margin. Inflorescence dichotomous, with (1–)2–6(–10) capitula; peduncles with 3–8 foliaceous floral bracts, white-tomentose, and white-pilose, eglandular. Involucres large, 14.0–18.5 mm long, swollen; all involucre bracts quite acute, outer spreading, foliaceous, very broad, elliptical to lanceolate, green, inner more or less linear, dark, with dense (130–160) white hairs 3–5 mm long, with scattered (10–30) fine glands 0.1–0.2 mm long along margin; without stellate hairs. Corollas light yellow; ligule teeth somewhat ciliate. Stigmas yellow to dark. Achenes 3.3–4.5 mm long, brown to black. Flowering July to August.

On rocks, stony talus and sunny grass patches in foothills and to alpine zone (850–)1300–2600 m., almost exclusively on calcareous substrate. One of the common alpine plants.—*European Part:* Upper Dniester (Carpathian Mountains: Svidovets). *General distribution:* Central Europe, Mediterranean, Balkans-Asia Minor. Described from Austria. Type in London.

451. **H. dentatum** Hoppe in Sturm, Deutschl. Fl. 39 (1815), t. 16; Koch, Synopsis, 2, II, 518; Gris. Comm. 67; Fr. Epicr. 62; N.P. Hier. Mitteleur. II, 172; Zahn in Pflzr. IV, 280, 97; Asch. and Graebn. Synopsis, XII, II, 123.—*H. pilosum* Froel. in DC. Prodr. VII (1838) 229 p. p.—**Ic.:** Rchb. Ic. Fl. Germ. XIX, 96, t. 201; Pflzr. (l. c.) 100, fig. 12.—**Exs.:** Fl. exs. A.–H. Nos. 3329, 3751; Zahn, Hier. Europ. Nos. 43, 44, 153–158, 247–250; 362–364, 456–458, 570–572, 646; Hier. Naeg. Nos. 369–380.

Perennial. Stem 20–50 cm high, erect or flexuous, slender to somewhat thick, more or less densely covered with soft, white hairs, eglandular, densely stellate-hairy above. Basal leaves 2–3 to 12, more or less petiolate, elliptical, oblong to lanceolate, obtuse to acute (outer leaves often lobed), green to somewhat glaucescent, sinuately serrate

(outer leaves more or less entire), sparse to more or less dense soft, white hairs 1–3 mm long, mostly without stellate hairs; cauline leaves 2–5 (rarely more) (coefficient of leafiness on average 0.09), bottom leaves large and more or less petiolate (mostly crowded in lower 1/4 of stem), upper sessile, smaller, to linear. Inflorescence shallowly dichotomous, with (1–)2–4(–7) capitula; peduncles sparsely pubescent, eglandular, with scattered stellate hairs. Involucres (11–)12–16(–18) mm long, ovate, later swollen; involucre bracts narrow to somewhat broad, sharply acute, dark to black, more or less approximate (inner bracts linear or subulate), pubescence moderate to more or less dense
 395 (60–110) with light-colored hairs 1–3 mm long, glands (20–60), tiny, 0.1–0.2 mm long, only at tips of bracts, stellate hairs absent or to scattered (along margin only). Stigmas dark. Achenes 3–4 mm long. In habit resembling *H. villosum* Jacq. Flowering July to August.

On calcareous rocks and alluvial deposits, often together with *H. villosum*, at 1300–2500 m.—*European Part*: Upper Dniester (Carpathian Mountains). *General distribution*: Central Europe (particularly in the eastern part), Balkans-Asia Minor (Balkans). Described from Austria. Type unknown.

Note. It is considered as a transitional form between *H. villosum* Jacq. and *H. bifidum* Kit., perhaps of hybrid origin.

Section 15. *Glauca* Gris. Comm. (1852) 67; Fr. Epicr. 66 p. max. p.; Zahn in Pflzr. IV, 280, 40; Asch. and Graebn Synopsis, XII, II, 6.—*Stirps H. glauci* Fr. Symb. (1848) 77 p. p.—*Glaucina* N.P. Hier. Mitteleur. II (1886) 1 p. p.—Stem with two to many leaves, branched, often glabrous; leaves linear or (narrowly) lanceolate, without pubescence (above always) or with scattered pubescence along midrib beneath and at base; cauline leaves sessile, with attenuate base, glaucous; inflorescence paniculate or shallowly forked, with 2 or more capitula; involucre bracts narrow, crowded, mostly glabrous (and eglandular) or with quite sparse pubescence and occasional glands, but more or less stellate-hairy, hence margin gray; corolla teeth eciliate.

The members of section *Glauca* are characteristic representatives of the European Alps (in a broad sense), which grow on calcareous rocks and talus in the mountains and foothills. Apparently, only one species *H. bupleuroides* Gmel. grows in our country (in Carpathian Mountains).

452. ***H. bupleuroides*** Gmel. Fl. Bad. III (1808) 317, t. 2; Fr. Symb. 80; Epicr. 72; N.P. Hier. Mitteleur, II, 15; Zahn in Schinz and Keller, Fl. Schweiz, 601; Pflzr. IV, 280, 44; Hegi, Ill. Fl. VI, 2, 1244; Asch. and Graebn. Synopsis, XII, II, 9.—**Ic.**: Rchb. Ic. Fl. Germ. XIX, 97, t. 204,

fig. I, II, t. 205, fig. I.—**Exs.:** Hier. Naeg. Nos. 305–315; Zahn Hier. Europ. Nos. 24, 25, 142, 228, 340; Fl. exs. A.–H. Nos. 3317–3319.

Perennial. Stem 20–40(–60) cm high, slender, mostly glabrous. Basal leaves many (to 15), lanceolate to linear-lanceolate, sessile, entire or with short, remote teeth, acute, glaucous, glabrous or sometimes with somewhat long and soft hairs beneath along midrib and margin (in forms transitional to *H. villosum*), eglandular and without stellate hairs; cauline leaves (3–)5–10 (rarely more) (coefficient of leafiness on average 0.15), lanceolate, gradually transitional to floral bracts. Inflorescence shallowly forked or openly paniculate, with 2–5(–16) capitula (mostly undeveloped); peduncles glabrous or with occasional hairs, occasionally with glands, scatteredly stellate-hairy below capitula.

396 Involucres 12–15 mm long, later swollen; involucre bracts broad, subobtusate, glabrous, to sparsely covered with light-colored hairs (in forms transitional to *H. villosum*), eglandular or with occasional glands and with up to conspicuous stellate hairs crowded along margin (dorsally glabrous). Corolla teeth eciliate. Stigmas yellow or dark. Achenes 3.5–4.0 mm long, dark brown, of different shades. Flowering July to August.

On calcareous rocks and talus, in open forests and scrubs in mountains, at 500–2000 m.—*European Part:* Upper Dniester (Carpathian Mountains). *General distribution:* Central Europe, Mediterranean Region, Balkans-Asia Minor (Balkans). Described from Baden. Type unknown.

Subgenus III. PILOSELLA Tausch in Flora, IX, 1 (1828), Erg.-Bl. 50; Fr.-Symb. 1; Epicr. 9; Griseb. Comm. 3; Arv.-Touv. Hier. Alp. fr. 1; Zahn in Koch, Synopsis, 3, III, 1698; Pflzr. IV, 280 (1921) 32, (1923) 1147; Asch. and Graebn. Synopsis, XII, I, 4.—*Piloselloidea* Koch, Synopsis, 1 (1837) 443; N.P. Hier Mitteleur. I, 114.—Involucre bracts conspicuously spiralled (multiseriate-imbricate). Pappus biseriate of intermingled short and long hairs (short hairs fewer), thinner and more numerous than in majority of species of *Euhieracium*. Vegetative regeneration by winter-dormant rosettes, forming shoots in many sections of rhizome. Fertilization partly normal, partly apogamous. Leaves usually entire or (very rarely) weakly toothed, gradually narrowed to petiole (leaf base never rounded, truncate nor cordate). See also key to sections (p. 6).

The term “acladium”, found in the descriptions of hawkweeds, refers to the unbranched apical part of a stem with a terminal capitulum; in other words the “acladium” is the first-order peduncle.

Section 16. Echinina N.P. Hier. Mitteleur. I (1885) 117, 479, 815; Zahn in Pflzr. IV, 280, 1366; Asch. and Graebn. Synopsis, XII, I, 7, 260,

1929.—Characters in key to sections (p. 9).—Stem compact, often flexuous; rhizome without shoots (but perhaps short underground shoots in forms transitional to *Cymosina*); leaf rosettes mostly entirely withering before anthesis; cauline leaves comparatively many, lanceolate or oblong, stiff; plants mostly thickly covered with bristles (often long) and stellate hairs. Inflorescence (pseudo-)umbellate or paniculate with umbellate tip (dichotomous in forms transitional section *Pilosellina*); involucre of medium size, whitish or grayish from abundant light-colored, simple and stellate hairs.

Xerophytes, growing in steppes and semideserts, in the northern and western parts of the range in arid sandy locations (for example, thin pine forests). The vast range stretches like an arc from the eastern half of Central Europe through the southern half of Eastern Europe and Siberia up to Soviet Central Asia.

- 397 The reference by Zahn (*Pflzr.* op. cit. p. 1367, map) to Eastern Siberia is purely speculative and needs confirmation. Judging from the specimens in the Herbarium of the Botanical Institute of the Academy of Sciences of the USSR and published sources, the species of the subsections *Procera* and *Echioidea* spreading the most in the eastern direction do not go that far, as shown in the map of Zahn. The species of *Echioidea* are found up to the Angara-Sayans District and those of *Procera* up to and including the Dauria district, but not reaching the Far East and Manchuria (see Komarov, *Fl. Manchzh.*, III, 790–793, 1901–1907).

KEY TO SUBSECTIONS OF SECTION ECHININA

1. Leaves eglandular, as a whole glands on plants either entirely absent or in more or less insignificant number on inflorescence (a more or less conspicuous number indicates a character transitional to other sections).....2.
- + Leaves glandular, whole plant, particularly involucre bracts, densely glandular.....Subsection 1. **Incana** Juxip
2. Cauline leaves with contracted or uniformly broad base.....3.
- + Cauline leaves with broadened and slightly amplexicaul base.....Subsection 2. **Caucasica** Juxip
3. Hairs on stem horizontally spreading, inflorescence mostly paniculate.....Subsection 3. **Procera** Juxip
- + Hairs on stem (typically) erect (at least in lower part of stem) or even appressed; inflorescence mostly umbellate.....Subsection 4. **Echioidea** Juxip

Subsection 1. Incana Juxip.—*H. incanum* M.B. Fl. taur.-cauc. II (1808) 253; Ldb. Fl. Ross. II, 853; Boiss. Fl. Orient. III, 865; N.P. Hier.-Mittleur. I, 491; Schmalh. Fl. II, 159; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1086.—*H. verruculatum* Link. Enum. hort. Berolin. II, 2 (1822) 287, No. 3450; Zahn in Pflzr. IV, 280, 1373; Asch. and Graebn. Synopsis, I, 261 (nota); Grossh. Fl. Kavk. IV, 275.—*Pilosella incana* Sz. Sz. in Flora, XIV (1862) 431.—Characters in key to subsections. In its stellate pubescence it resembles *Echioidea* and in type of inflorescence—*Procera*, but in shape and attachment of leaves—*Caucasica*; distinguished from all three subsections by abundance of glands not only on involucre but mostly on leaves also. Involucres thick; corollas and stigmas yellow; pubescence more or less sparse, short, and stiff. Regeneration by rosettes. Mainly plants of Caucasus and Asia Minor (up to and including Iran); sporadically found in southern part of European territory of Soviet Union.

1. Involucral bracts and peduncles glabrous or with only occasional hairs.....2.
- + Involucral bracts and peduncles hairy and glandular.....6.
2. Involucral bracts with occasional short hairs; peduncles glabrous; cauline leaves to 12; plants tall.....457. **H. farinodermum** Litw. and Zahn
- 398 + Involucral bracts and peduncles glabrous.....3.
3. Coefficient of leafiness 0.16–0.18; leaves yellowish-green; involucres 7–8 mm long.....455. **H. sosnowskyi** Zahn
- + Coefficient of leafiness 0.08–0.13; leaves grayish-green.....4.
4. Leaves glandular on both sides and along margin.....5.
- + Leaves eglandular; involucral bracts very narrow, quite acute.....456. **H. karpinskyanum** N.P.
5. Involucres 10–11 mm long; involucral bracts somewhat broad and obtuse; acladia 4–8 mm long; middle cauline leaves with attenuate base; inflorescence with 10–20 capitula.....453. **H. incanum** (M.B.) N.P.
- + Involucres 9–10 mm long; involucral bracts narrow, very acute; acladia 8–20 mm long; middle cauline leaves amplexicaul, with somewhat winged base; inflorescence with 30–60 capitula.....454. **H. verruculatum** (Link) N.P.
- 6 (1). Involucral bracts and peduncles sparsely glandular; hairs on peduncles sparse; leaf pubescence sparse; acladia medium (12–15 mm long).....458. **H. akinfiewii** Woron. and Zahn
- + Involucral bracts and peduncles scatteredly to moderately glandular; hairs on peduncles scattered; leaves moderately pubescent; acladia long (30 mm long).....459. **H. kozlowskyanum** Zahn

Cycle 1. Verruculata Juxip.—Subgrex *H. verruculatum* Zahn in Pflzr. IV, 280 (1923) 1374.—Involucral bracts and peduncles glandular only (as an exception, sometimes with occasional hairs also).

453. **H. incanum** (M.B.) N.P. Hier. Mitteleur. I (1885) 492.—*H. asperum* M.B. ex Fr. Symb. (1848) 44.—*H. tephropolium* Zahn in Pflzr. IV, 280 (1923) 1374.—*H. scabrum* (Willd.) Froel. in DC. Prodr. VII (1838) 213.—**Exs.:** GRF No. 2077.

Perennial. Stem 60–90 cm high, 3–5 mm in diameter, quite densely covered only at base with light-colored, widely spaced bristles 2–3 mm long, with very scattered glands, densely stellate-hairy. Basal leaves at anthesis usually 1–2, elliptical-oblong to lanceolate, acuminate, grayish-green; cauline leaves 8–9(–12) (coefficient of leafiness 0.13), lower attenuate to base, middle sessile, with slightly attenuate base, upper leaves more or less lanceolate, hairs on both sides and as a whole sparse, with bristles 3–4 mm long above and soft hairs beneath, along margin with scattered and beneath along midrib moderate pubescence, on both sides densely stellate-hairy and with scattered glands. Inflorescence open, spreading paniculate, with 10–20 capitula; acladium short, 4–8 mm long; peduncles glabrous, with sparse to scattered glands white-tomentose; floral bracts grayish. Involucres 10–11 mm
399 long, ovate, thick, later somewhat compressed; involucral bracts more or less broad and obtuse, dark gray, scarcely bordered, glabrous (f. *verum* Zahn) or with occasional hairs (f. *pilosiceps* Zahn), moderately (40–50) glandular (glands 0.3–0.5 mm long, mostly botryoidly clustered at tip), grayish from dense stellate hairs. Corollas yellow. Stigmas yellow. Flowering June to August. (Plate XXXIV, Fig. 2.)

Dry slopes, open forests and mountain meadows, to middle zone (to 2100 m).—*European Part*: Upper Dniester; *Caucasus*: Ciscaucasia, Eastern Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern part), Armenia-Kurdistan, Iran. Described from Asia Minor. Type in Munich.

Note. Apparently, *H. barevanicum* Woron. and Zahn (in *Vestn. Tifl. Bot. Sada*, 22, 21; in Engl. Pflzr. IV, 280, 1374) should be referred to this species. It is distinguished by narrowly lanceolate leaves and smaller (6–7 mm long) involucres, described from the former Artvin District but also found in Eastern Transcaucasia.

454. **H. verruculatum** (Link) N.P. Hier. Mitteleur. I (1885) 492; Zahn in Pflzr. IV, 280, 1374.

Perennial. Stem 40–100 cm high, 4–6 mm in diameter, glabrous, with sparse glands above, densely stellate-hairy. Basal leaves absent or 1–2; cauline leaves 4–10 (coefficient of leafiness 0.10), lower leaves quite

large, to 17 cm long (3.5:1), elliptical-oblong, obtuse to subacute, narrowed toward base, middle leaves with amplexicaul, somewhat winged base, upper leaves linear-lanceolate, acute, pubescence as a whole sparse, setose above, hairs 0.5–1.0(–3) mm long, hairs along margin and beneath to scattered, softer, 1.5–2.0 mm long, stellate hairs on both sides scattered to very dense, hence leaves grayish-green, with sparse to scattered glands on both sides. Inflorescence very openly paniculate with 40–60 capitula; acladium 8–20 mm long; peduncles glabrous, with sparse glands above, but quickly decreasing downward, white-tomentose; floral bracts light gray. Involucres 9–10 mm long, cylindrical; involucral bracts narrow, very acute, glabrous, to moderately, 40–50, glandular, glands 0.3 mm long, grayish from stellate hairs. Flowering June to August.

Mountain slopes and forest edges.—*Caucasus*: Eastern and Southern Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern part), Armenia-Kurdistan, Iran. Described from Somkhetia. Type in Munich.

455. **H. sosnowskyi** Zahn in Vestn. Tifl. Bot. Sada, 21 (1912) 5; Pflzr. IV, 280, 1375.

Perennial. Stem (35–)60–90 cm high, 3–7 mm in diameter, at base to scattered-setose with bristles decreasing upward, 3–5 mm long, glabrous above, sparsely glandular (glands throughout), densely stellate-hairy above. Basal leaves absent. Cauline leaves 10–15 (coefficient of leafiness 0.18), mostly in lower half of stem, lower leaves large, 400 oblong-lanceolate or broadly lanceolate, long-acuminate, yellowish-green, with scattered bristles 2–5 mm long, with horizontally spreading bristles and sparse, dark brown glands along margin, stellate hairs sparse above, scattered beneath. Inflorescence paniculate, with 15–35 capitula, acladium short; peduncles without simple hairs, with glands scattered to moderate, white-tomentose. Involucres 7–8(–9) mm long, ovate; involucral bracts narrow, acute, dark gray, glabrous, moderately, (30–)45–55(–70), glandular with glands 0.3–0.5 mm long and stellate-hairy. Corollas dark yellow. Stigmas yellow. Conforms to series *Incana* > *Procera*. Flowering June to July.

Montane forests.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from Mashhad. Type in Tbilisi.

Note. Apparently, *H. alexandrii* Kem.-Nat. (*Fl. Gruzii*, VIII, 757; *Zam. po Sist. i. Geogr. r. Tbil. Bot. Inst.* 17, 131) (= *H. incanum* M.B. ssp. *giganteum* Grossh. in Grossh. and Schischk. *Pl. Orient. exs.* (1924), No. 100) should also be included here.

456. **H. karpinskyanum** N.P. Hier. Mitteleur. I (1885) 493; Zahn in Pflzr. IV, 280, 1375.

Perennial. Stem 45–70 cm high, 3–5 mm in diameter, at base moderately covered with short hairs 0.5–1.0 mm long, decreasing upward, and at top quite sparse, sparsely glandular above, grayish from stellate hairs. Basal leaves mostly persisting at anthesis, 6–8, lanceolate to linear, all sessile with broad base and acute, grayish-green, densely pubescent on both sides (with bristles 1 mm long above, softer hairs beneath), on both sides moderately stellate (grayish)-pubescent, eglandular; cauline leaves 4–6 (coefficient of leafiness 0.08), upper with occasional glands. Inflorescence openly umbellate with 25–45 capitula, acladium 10–22 mm long; peduncles without simple hairs, with occasional glands, white-tomentose; floral bracts dark gray. Involucres 7–8 mm long, cylindrical, later ovate; involucral bracts very narrow, very acute, dark gray, glabrous, to moderately glandular, grayish from stellate hairs. Flowering June to July.

Dry slopes.—*European Part*: Volga-Don Region. Endemic? Described from former Sviyaga District of former Kazan Province. Type in Munich.

457. *H. farinoderemum* Litw. and Zahn in Fedde, Repert. III (1907) 181; Pflzr. IV, 280, 1374.

Perennial. Stem to 110 cm high, with scattered short (0.5 mm long) hairs, with sparse glands and scattered stellate hairs. Basal leaves absent or few (1–2), oblong-lobed, obtuse; cauline leaves to 12 (coefficient of leafiness 0.11), lower long (to 18 cm long), lanceolate, with
401 long-attenuate base, subacute (9:1), middle leaves widely spaced, with tapered base, upper (narrow) leaves with uniformly broad base, grayish-green, with sparse to scattered hairs 0.5 mm long, grayish from stellate hairs, sparsely glandular. Inflorescence umbellate-paniculate, with up to 50 capitula, acladium 5–15 mm long; peduncles without simple hairs, with scattered glands, grayish-tomentose. Involucres 7–8 mm long; involucral bracts somewhat narrow, with occasional short hairs, very densely glandular, glands 0.3–0.4 mm long, grayish-green from stellate hairs. In habit, it resembles *H. cymigerum* (Rchb.) N.P. Flowering June to July.

Montane forest zone, at 1260 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Teberda. Type unknown.

Cycle 2. Hamadania Juxip.—Subgrex *H. hamadanense* Zahn in Pflzr. IV, 280 (1923) 1375.—Involucral bracts hairy and glandular; leaves glandular.

458. *H. akinfiewii* Woron. and Zahn in Vestn. Tifl. Bot. Sada, 11 (1908) 13; Pflzr. IV, 280, 1375.

Perennial. Stem 60–70 cm high, 3–5 mm in diameter, only at base with bristles 1–3 mm long, above sparsely glandular and densely stellate-hairy, decreasing downward. Basal leaves absent or 1–2; cauline leaves to 8(–11) (coefficient of leafiness to 0.15), crowded mostly in lower half of stem (upper 2–3 leaves quite widely spaced, narrow), very long, lanceolate, with broad sessile base, subacute, glaucescent, glabrous above or with occasional hairs, very sparsely hairy beneath, with scattered to sparse bristles 2–3 mm long along margin and midrib beneath, as a whole to densely pubescent, above and particularly beneath with sparse tiny glands, quite densely stellate-hairy on both sides. Inflorescence umbellate-paniculate bearing to 25 capitula, acladium (7)12–15 mm long, peduncles with sparse bristles and glands, grayish-tomentose; floral bracts glandular and with occasional bristles. Involucres (7–)8–9 mm long, ovate; involucre bracts somewhat broad, subacute to acute, dark gray with light-colored border, with scattered bristles 1–2(–3) mm long and scattered glands, densely stellate-hairy. Corollas light yellow. Stigmas yellow. Flowering July.

European Part: Upper Dnieper(?); Caucasus: Eastern and Southern Transcaucasia. Endemic. Described from Bakuriani. Type unknown.

Cycle 3. Kozlowskyana Juxip.—*H. kozlowskyanum* Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 3.—*H. verruculatum-pilosella* Zahn in Pflzr. IV, 280 (1923) 1386.—*H. setigerum* grex and ssp. *adenocephalum* N.P. Hier. Mitteleur. I (1885) 499, 500; nec Sch. Bip.; nec Britton.—*H. incanum*—*Pilosella* N.P. Hier. Mitteleur. I. c.—Involucre bracts and peduncles hairy and glandular; leaves eglandular.

402 459. *H. kozlowskyanum* Zahn in Vestn. Tifl. Bot. Sada 29 (1913) 3; Pflzr. IV, 280, 1386; Grossh. Fl. Kavk. IV, 277.

Perennial. Stem 30–45 cm high, at base quite densely covered with bristles 3–5 mm long, with scattered ones above, with scattered or sparse glands at top reaching down to middle of stem, densely stellate-hairy. Basal leaves few (3), long, lanceolate, moderately setose on both sides, moderately stellate-hairy above but more densely beneath, hence leaves grayish-green; cauline leaves 3–4 (coefficient of leafiness 0.10), widely spaced, on both sides densely stellate-hairy, eglandular. Inflorescence openly paniculate, with 10–15(–20) capitula; acladium 30 mm long; peduncles with scattered bristles 3 mm long, moderately short-glandular, grayish-tomentose. Involucres 8 mm long, subglobose; involucre bracts somewhat broad, acute, black, with green border, toward tip, more or less covered with scattered white hairs 1.5–2.0 mm long having thick, dark base, and with scattered short glands, densely stellate-hairy. Corollas and stigmas yellow. Flowering July.

Upper montane forest zone.—*Caucasus:* Eastern Transcaucasia. Endemic. Described from Bakuriani. Type unknown.

Subsection 2. Caucasica Juxip.—*H. caucasicum* N.P. Hier. Mitteleur. I (1885) 490; Zahn in Pflzr. IV, 280, 1370; Asch. and Graebn. Synopsis, XII, I, 260 (nota); Grossh. Fl. Kavk. IV, 277.—Characters in key to subsections of section *Echinina*.

In habit resembling healthy specimens of *Echioidea*, it is distinguished by leaves with semiamplexicaul or broad, rounded base, inflorescence densely umbellate (less often openly paniculate) setose hairs on plants more or less widely spaced from each other, corollas and stigmas yellow, and regeneration by sessile rosettes or underground buds. The subsection has a very limited distribution: Caucasus and Armenian-Iran highland.

1. Inflorescence almost umbellate, more or less dense, with very short (2–6 mm long) acladium; involucre bracts and peduncles eglandular; cauline leaves more or less amplexicaul, widely spaced.....2.
- + Inflorescence very openly paniculate; acladium long (30 mm long); involucre bracts and peduncles with occasional glands; cauline leaves somewhat tapered toward base, crowded mostly in lower half of stem; coefficient of leafiness 0.20; involucre 9 mm long.....462. **H. schelkownikowii** Zahn
2. Coefficient of leafiness 0.20; peduncles glabrous; floral bracts whitish.....460. **H. caucasicum** N.P.
- + Coefficient of leafiness 0.12; peduncles with occasional to moderate hairs; floral bracts gray.....461. **H. hohenackeri** (Sch. Bip.) N.P.

403 **Cycle 1. Caucasica**.—*H. caucasicum* N.P. Hier. Mitteleur. I (1885) 490; Zahn in Pflzr. IV, 280, 1370.—inflorescence more or less umbellate, with very short (2–6 mm long) acladium.

460. **H. caucasicum** N.P. Hier. Mitteleur. I (1885) 490; Zahn in Pflzr. IV, 280, 1370.

Perennial. Stem 40–70 cm high, 1.0–1.5(3.0) mm in diameter, very densely setose at base with bristles 3–6 mm long, decreasing upward, eglandular, densely stellate-hairy. Basal leaves mostly withering before anthesis (or 1–2); cauline leaves 9(8–13) (coefficient of leafiness 0.20) oblong-ovate, subacute, lower somewhat attenuated to petiolate base, middle and upper leaves semiamplexicaul, sessile (5:1), on both sides moderately pubescent with thin bristles 3–4(–6) mm long above and soft hairs beneath, without or with sparse stellate hairs above, moderately pubescent beneath. Inflorescence densely paniculate, with 10 capitula; acladium very short, 2–3 mm long; peduncles glabrous and

eglandular, white-tomentose; floral bracts whitish. Involucres 6.5 mm long, ovate, involucre bracts somewhat broad, acute, dark gray, scarcely bordered, with sparse, 30(18–44), hairs 2–3 mm long, eglandular, grayish from stellate hairs. Stigmas yellow. Flowering June to July.

Dry slopes, in middle montane zone, at 600–1000 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern part), Armenian-Kurdistan Region. Endemic. Described from Caucasus. Type in Munich.

461. **H. hohenackeri** (Sch. Bip.) N.P. Hier. Mitteleur. I (1885) 491; Zahn in Pflzr. IV, 280, 1370.—*H. setigerum* Hohen. exs. in sched. (1843) p. p.—*H. sabinum* Boiss. Fl. or. III (1875) 863, suppl. (1888) 327 p. p., nec Seb. Maur.—**Exs.**: GRF No. 2066.

Perennial. Stem 35–65 cm high, 1.5–2.0 mm in diameter, at base with very dense light-colored hairs 2.0–2.5 mm long, gradually decreasing upward, with occasional hair, above eglandular, densely stellate-hairy. Basal leaves mostly withering before anthesis; cauline leaves (4–)6–8 (coefficient of leafiness 0.14–0.20), lower leaves somewhat petiolate, middle and upper semiamplexicaul (4.6:1), very densely setose above, bristles 2.5–3.5 mm long, with scattered pubescence beneath, sparsely stellate-hairy above but moderately beneath. Inflorescence more or less corymbose-umbellate, dense, with 10–15 capitula; acladium short, 3–6 mm long; peduncles with occasional to moderate hairs, eglandular, white-tomentose; floral bracts gray. Involucres (6.5–)7.5–8.0 mm long, cylindrical; involucre bracts narrow, acute, dark gray, with light-colored border, with moderate, 40(30–55), hairs 1.5(–4.0) mm long, eglandular (sometimes with occasional glands at tip), gray from pubescence. Stigmas yellowish-brown. Flowering June to July.

Dry slopes and scrubs, in middle montane zone.—*Caucasus*: Ciscaucasia, Eastern and Western Transcaucasia, Talysh. Endemic. Described from Beshtau Mountain. Type in Munich.

Note. Apparently, *H. sommieri* Peter (in Nachr. K. Ges. Wiss. Götting. 1898, 16; Zahn in Pflzr. IV, 280, 1370), described from Eastern Transcaucasia (Tbilisi), should also be referred to this species; it is distinguished by its diffuse inflorescence.

Cycle 2. Schelkownikowia Juxip.—*H. schelkownikowii* Zahn in Vestn. Tifl. Bot. Sada, 21 (1912) 6; Pflzr. IV, 280, 1386.—*H. caucasicum* > *pilosella* Zahn l. c.

In habit it resembles *H. rothianum* Wallr. or *H. macrotrichum* Boiss. Inflorescence very openly paniculate with long (30 mm long) acladium.

462. **H. schelkownikowii** Zahn in Vestn. Tifl. Bot. Sada, 21 (1912) 6; Pflzr. IV, 280, 1386; Grossh. Fl. Kavk. IV. 277.

Perennial. Stem to 45 cm tall, thickish, 3 mm in diameter, flexuous, densely setose at base with long (4–10 mm) bristles, with moderate dark bristles 3–4 mm long upward, eglandular, densely stellate-hairy throughout. Basal leaves (–4) mostly withering before anthesis (lanceolate, subobtusate); cauline leaves to 8 (coefficient of leafiness 0.20), lanceolate, long-attenuate to base, mostly in lower half of stem, gradually reduced upward, on both sides with scattered to moderate bristles 4–6 mm long, sparsely stellate-hairy above but moderately beneath. Inflorescence very openly paniculate, with 12–18 capitula; acladium usually long (to 30 mm); peduncles densely setose with dark bristles 3–5 mm long, sometimes with occasional glands below capitula, grayish from stellate hairs. Involucres 9.0–9.5 mm long, subglobose; involucre bracts narrow, acute, dark, inner with light-colored border, with scattered 47(40–52), hairs to 4 mm long and occasional, 9(6–12), glands 0.3–0.5 mm long, scatteredly stellate hairy. Corollas yellow, teeth of ray florets sometimes slightly reddish. Stigmas yellow. Flowering July to August.

High mountain meadows, at 2400 m.—*Caucasus*: Talysh. Endemic. Described from Lenkoran District. Type in Tbilisi?

Note. In *Flora Gruzii* (VIII, 1952), *H. schelkownikowii* was erroneously identified with *H. persicum*, Boiss., which is a synonym of *H. procerum* Fr.

Subsection 3. Procera Juxip.—*H. procerum* Fr. Symb. (1848) 43; Epicr. 41; Boiss. Fl. or. III, 864; N.P. Hier. Mitteleur. I, 487; Zahn in Pflzr. IV, 280, 1371; Asch. and Graebn. Synopsis, XII, I, 261 (nota); 405 Grossh. Fl. Kavk. IV, 276.—*H. persicum* Boiss. Diagn. II (1854) 60.—*Pilosella procera* Sz. Sz. in Flora, XIV (1862) 431.—Characters in key to subsections of section *Echinina*.

Species of subsection *Procera* are distinguished from those of subsection *Echioidea* by a more robust habit, an angular-sulcate stem with spreading bristles, cauline leaves with a narrow or uniformly broad base, a spreading-paniculate inflorescence, glands on the involucre bracts (sometimes even on the peduncles) and by inflorescence branches longer than the acladium. However, although identification of typical specimens is not very difficult, in the case of forms transitional to *Echioidea* or small specimens of *Procera*, it is difficult sometimes to distinguish them from some *Echioidea* (for example, *H. echioidea* Lumn. var. *patentipilum* N.P.). We also are inclined to refer to this variety some specimens of *Procera* cited by Zahn (in Fedtsch. and Flerow. *Evrop. Ross.* 1085) for southern Russia (Astrakhan,

Kharkov, Starobelsk). It is also possible that the Crimean specimens should be referred to *H. procereiforme* N.P. Completely authentic specimens of *H. procerum* N.P. have come from the Caucasus and Soviet Central Asia.

1. Involucral bracts densely pubescent (hairs mostly concealing bracts); leaves also densely pubescent; coefficient of leafiness 0.11–0.22).....2.
- + Involucral bracts with scattered to sparse hairs, sparsely glandular; peduncles with sparse glands; occasional glands present even at top of stem; pubescence of leaves barely to scattered; coefficient of leafiness 0.13.....468. **H. woronowianum** Zahn
2. Glands on involucral bracts absent or sometimes only occasional at tips of bracts.....3.
- + Glands on involucral bracts scattered to sparse.....7.
3. Involucral bracts entirely eglandular.....4.
- + Involucral bracts with occasional glands at tip.....6.
4. Peduncles more or less moderately to densely pubescent.....5.
- + Peduncles with scattered to sparse hairs; involucre (7.5)9–10 mm long; involucral bracts acute, narrow, floral bracts gray; acladium short (2–4 mm long).....464. **H. procerum** (Fr.) N.P.
5. Peduncles moderately pubescent; involucre (8–)10.0–10.5 mm long; involucral bracts very acute, very narrow, floral bracts whitish; acladium medium (8–15 mm long); stem and leaves very densely setose with long bristles.....463. **H. macrochaetium** N.P.
- + Peduncles densely pubescent; involucre 10–12 mm long; involucral bracts subobtusate, broad; floral bracts greenish, large; acladium long, 20–45 mm long.....465. **H. balansae** Boiss.
- 406 6 (3). Peduncles densely setose; involucral bracts subobtusate, broad; floral bracts large, greenish; acladium long, 20–45 mm.....465. **H. balansae** Boiss.
- + Peduncles with scattered to sparse pubescence; involucral bracts acute, narrow; floral bracts gray; acladium short (2–4 mm long).....464. **H. procerum** (Fr.) N.P.
- 7 (2). Glands on involucral bracts and peduncles sparse to occasional; acladium moderately pubescent; second-order peduncles sparsely to very sparsely pubescent; stem in upper part more or less glabrous; floral bracts large, light-colored.....466. **H. phrygium** Zahn
- + Glands on involucral bracts to scattered; peduncles eglandular, glabrous; floral bracts gray.....467. **H. buhsei** N.P.



Plate XXIII.

1—*H. schischkinii* Juxip; 2—*H. submarginellum* Zahn.

Cycle 1. Procera Juxip.—*H. procerum* (Fr.) N.P. Hier. Mitteleur. I (1885) 487; Zahn in Pflzr. IV, 280, 1371.—*H. macrotrichum* N.P. l. c. (1885) 478; Zahn l. c. 1378.—All parts of plants densely covered with more or less long to very long (up to 16 mm) setose hairs, on involucre, for example, often concealing involucre bracts; glands mostly absent or occasional on involucre bracts; coefficient of leafiness 0.22–0.16.

463. **H. macrochaetium** N.P. Hier. Mitteleur. I (1885) 489; Zahn in Pflzr. IV, 280, 1372.

Perennial. Stem 55–85 cm high, 2–3 mm in diameter, densely setose at base with widely spaced bristles, 4–10 mm long (very dense above), eglandular, densely stellate-hairy. Basal leaves absent; cauline leaves 12–18 (coefficient of leafiness 0.21), narrowly lanceolate to linear, acute, yellowish-green, on both sides densely fine-setose, bristles 4–6 mm long, sparsely stellate-hairy above, densely beneath. Inflorescence very openly paniculate, at top umbellate, with up to 25 capitula; akladium 8–15 mm long; peduncles moderately pubescent, eglandular, white-tomentose; floral bracts whitish. Involucre (8–)10.0–10.5 mm long, ovate, fleshy; involucre bracts very narrow and acute, with dense, 60(40–70), light-colored, soft hairs 3–8 mm long, eglandular, white-tomentose. Flowering June to July.

Dry slopes.—*Caucasus*: Western Transcaucasia (Novorossiisk); *Central Asia*: Aralo-Caspian Region. *General distribution*: Balkans-Asia Minor (eastern part). Described from Asia Minor. Type in Munich.

409 **Note.** Undoubtedly, *H. euxinum* B. Fedtsch. and Nevski (*Fl. i Sist.* 1, 210; Grossh. *Fl. Kavk.* IV, 276), described from the vicinity of Novorossiisk, should be referred to this species; it is distinguished from *H. macrochaetium* N.P. essentially only by longer pubescence, reaching 16 mm on the stem and leaves. Type in Leningrad.

464. **H. procerum** (Fr.) N.P. Hier. Mitteleur. I (1885) 488; Zahn in Pflzr. IV, 280, 1371.—*H. persicum* Boiss. Diagn. pl. or. I, 11 (1842–1854) 60.—**Exs.**: GRF No. 1332; Pl. Caucas. No. 197; Herb. Fl. cauc. No. 400.

Perennial. Stem 40–70(–100) cm high, 3–6 mm in diameter, densely setose at base with horizontally directed bristles 4–6 mm long, decreasing upward or quite dense at top, 2–4 mm long (var. *normale* N.P.), or with quite dense bristles 3–4 mm long below and thinning upward and almost absent at top (var. *calvatum* N.P.), eglandular, densely stellate-hairy. Basal leaves absent; cauline leaves (8–)12–14(–20) (coefficient of leafiness 0.22), oblong-lanceolate, acuminate, to 16 cm long (5:1), lower and middle leaves attenuate to sessile base, upper narrowly lanceolate, all leaves yellowish-green, densely setose on both sides

with bristles 3–5 mm long (particularly conspicuous beneath along midrib), stellate hairs very sparse above, to scattered beneath. Inflorescence very openly panicate and somewhat umbellate at top, with 15–50 capitula; acladium short, 2–4 mm long; peduncles with sparse simple hairs, eglandular, white-tomentose; floral bracts gray. Involucres (7–)9–10 mm long, cylindrical to subglobose, fleshy; involucre bracts narrow, acute, with scattered, 20(13–30), light-colored hairs (0.5–)2(–3) mm long, eglandular or with occasional, 5(0–7), glands on some bracts, densely stellate-hairy. Corollas and stigmas yellow. Flowering June to July. (Plate XXV, Fig. 1.)

Dry montane herb slopes and scrubs, in middle montane zone, to 2400 m.—*European Part*: Middle Dnieper (?), Trans-Volga Region (?), Crimea; *Caucasus*: Ciscaucasia, Dagestan, Eastern and Southern Transcaucasia, Talysh; *Western Siberia*: Altai; *Eastern Siberia*: Dauria; *Soviet Central Asia*: Mountainous Turkmenia, Syr-Darya, Pamiro-Alai. Described from Iran (Elburz [Mountains]). Type in Geneva (?).

465. **H. balansae** Boiss. Diagn. pl. or. II, 6 (1859) 119; Fl. or. III, 865; N.P. Hier. Mitteleur. I, 499 (sub *H. setigero*); Zahn in Pflzr. IV, 280, 1378; Asch. and Graebn. Synopsis, XII, I, 265; Grossh. Fl. kavk. IV, 277 (sub *H. macrotricho*); nec Freyn (1892).—*H. scabricaula* Bischoff, Del. sem. hort. Heidelb. (1847) ex Walp. Ann. I (1848) 465 and ex Fr. Epicr. (1862) 40; Kotschy, Iter. cil.-kurd. No. 328.—*H. radula* Fr. Epicr. l. c.—*Pilosella radula* Sz. Sz. in Flora, XIV (1862) 431.—*H. procerum-Pilosella* N.P. l. c.

- 410 Perennial. Stem 35–80 cm high, thick, with very dense, spreading, somewhat antrorse upward, brownish, bristles 6–10 mm long, eglandular, grayish from stellate hairs. Basal leaves at anthesis mostly absent; cauline leaves 4–16 (coefficient of leafiness 0.17), lower more or less crowded, large, to 20 cm long (5–10:1), oblong, obtuse or all (or upper 4–8) more or less acute, glaucescent, abruptly or more or less gradually reduced, densely pubescent above with coarse bristles 5–8 mm long, beneath with finer bristles 3–4 mm long, without or with sparse stellate hairs above, more or less densely tomentose beneath. Inflorescence very openly panicate, with (5–)10–22 capitula, some mostly undeveloped, acladium 20–45 mm long; peduncles densely setose, eglandular, white-tomentose; floral bracts large, greenish. Involucres (9.5–)10–12 mm long, ovate, later subglobose, very fleshy; involucre bracts broad, subobtuse, with dense (40–70) bristles 3–4 mm long concealing bracts, eglandular (sometimes with occasional glands at tips), gray from hairs. Corollas light-yellow. Stigmas yellow. Flowering May to July.

Dry slopes.—*Caucasus*: Southern Transcaucasia, Talysh. *General distribution*: Balkans-Asia Minor. Endemic. Described from Asia Minor. Type in Munich.

Note. A form with smaller involucre (7–10 mm long), light green leaves, and more slender peduncles (f. *minoriceps* Zahn) is found in Asia Minor, which may also be found in our country.

466. **H. phrygium** Zahn in Pflzr. IV, 280 (1923) 1371.—*H. setigerum* Kotschy, Iter. cil.-kurd. (1859) No. 502, non al.—*H. kotschyanum* N.P. Hier. Mitteleur. I (1885) 488, non Heuff.—**Exs.**: Bornmüller, Pl. Turkest. No. 90.

Perennial. Stem 70–90 cm high, 3–5 mm in diameter, very densely covered at base with light-colored, spreading bristles 3–4(–6) mm long, decreasing upward and very sparse at top, eglandular, moderately stellate-hairy. Basal leaves withering before anthesis; cauline leaves 10–15 (coefficient of leafiness 0.16), lower leaves quite large, oblong, gradually attenuate toward base, obtuse, gradually becoming smaller, middle and upper sessile, with broad but not amplexicaul base, acute, transitional to large floral bracts, yellowish-green, on both sides to very densely setose, bristles stiff, 3–4 mm long, bristles somewhat softer above than below, stellate hairs almost absent or sparse above, moderate beneath. Inflorescence very openly paniculate, with 50–70 capitula; acladium 6–17 mm long; peduncles variously pubescent; on acladium moderately so with light-colored hairs 1 mm long, with much less pubescence on second-order peduncles (with sparse to occasional hairs), glands below peduncles very sparse, decreasing downward, peduncles white-tomentose; floral bracts large, light-colored. Involucre 8–10 mm long, cylindrical or subglobose; involucre bracts
411 narrow, acute, gray, with light-colored border, bracts of terminal capitula with very dense hairs 4–5 mm long, bracts of other capitula with scattered to moderate hairs 1.0–1.5 mm long, soft, silky, sparse to occasional glands, gray from hairs. Corollas and stigmas yellow. Flowering May to June.

Dry mountain slopes, at 1400–2100 m.—*Soviet Central Asia*: Pamiro-Alai Region. *General distribution*: Balkans-Asia Minor (eastern part), Armenia-Kurdistan, Iran. Described from Asia Minor. Type in Munich.

Note. It is necessary to include var. *pseudobuhsei* Zahn (Pflzr. l. c.) here, which is found on the Gissar Range in our country (Bornmüller, Pl. Turkest. No. 90b).

467. **H. buhsei** N.P. Hier. Mitteleur. I (1885) 489; Zahn in Pflzr. IV, 280, 1372.

Perennial. Stem (15–)40–80 cm high, 1.5–2.5 mm in diameter, at base with moderately spreading bristles 3–6 mm long, decreasing upward, bristles sparse or absent at top, eglandular, with moderate to scattered stellate hairs. Basal leaves withering before anthesis or 1–2; cauline leaves (5–)12–15 (coefficient of leafiness 0.22), lanceolate, obtuse, lower leaves often approximate, quite large (to 20 cm long), others rather quickly becoming smaller or all leaves more or less evenly distributed along stem, lower tapered to base, middle sessile, with broad base, with dense fine bristles 2–4 mm long on both sides, moderately stellate-hairy above, densely so beneath. Inflorescence openly paniculate, with (8–)15–40 capitula; acladium 6–10 mm long; peduncles without simple hairs, eglandular, white-tomentose; floral bracts gray. Involucres 8–9 mm long, subglobose; involucre bracts narrow, acute, very densely pubescent with dark hairs 1–2 mm long, with scattered glands, gray from hairs. Corollas light-yellow. Stigmas yellow. Flowering June to July.

Mountain slopes, at 2400 m.—*Caucasus*: (districts not indicated). *General distribution*: Balkans-Asia Minor (eastern part), Armenia-Kurdistan, Iran. Described from Iran. Type in Munich.

Cycle 2. Woronowiana Juxip.—*H. woronowianum* Zahn in Vestn. Tifl. Bot. Sada, II (1908) 13; Pflzr. IV, 280, 1373.—*H. incanum-procerum* Zehn in Vestn. Tifl. Bot. Sada, I. c.—*H. procerum-verruculatum* Zahn in Pflzr. I. c.—Very much resembling *Procera*, being distinguished from it by the presence of glands (occasional to quite sparse on all parts) and shorter hairs; coefficient of leafiness 0.13.

468. *H. woronowianum* Zahn in Vestn. Tifl. Bot. Sada, 11 (1908) 13; Pflzr. IV, 280, 1373; Grossh. Fl. Kavk. IV, 276.

- 412 Perennial. Stem 50–90 cm high, 3–5 mm in diameter, at base very densely setose with bristles 3–4 mm long, gradually thinning upward, with occasional glands, stellate-hairy throughout. Basal leaves 1–3, more or less fugacious or entirely absent; cauline leaves 7–12 (coefficient of leafiness 0.14), mostly in lower half of stem, broadly lanceolate, quite large (16 cm long), long-attenuate to broad, sessile base, broadened toward top, then short-acuminate (6:1), gradually becoming smaller, sparsely short-pubescent on both sides, hairs 1.0–2.5 mm long, moderately setose beneath along midrib, bristles 2–4 mm long, with occasional glands along margin and midrib, densely stellate-hairy on both sides. Inflorescence paniculate, umbellate at top, with 25–40 capitula; acladium 8–12 mm long; peduncles with sparse bristles 3 mm long, and sparse glands, tomentose. Involucres (7–)9–10 mm long, ovate; involucre bracts narrow, very acute, with scattered to

sparse hairs 2.0–2.5 mm long, sparsely glandular, densely stellate-hairy. Corollas and stigmas yellow. Flowering June to July.

Forest edges and dry slopes, to middle montane zone.—*Caucasus*: Eastern Transcaucasia, Talysh. *General distribution*: Armenia-Kurdistan, Iran. Endemic. Described from Talysh. Type unknown.

Subsection 4. Echioidea Juxip.—*H. echioides* Lumn. Fl. Poson. I (1791) 348; N.P. Hier. Mitteleur. I, 481; Zahn in Pflzr. IV, 280, 1366.—*H. proceriforme* N.P. l. c. p. 482, 486; Zahn l. c. 1369.—*H. maschukense* Litw. and Zahn in Pflzr. l. c. 1372.—*H. sterrochaetium* N.P. l. c. p. 493; Zahn in Pflzr. l. c. 1377.—*H. rothianum* Wallr. 1822, Sched. crit. 417; Zahn in Pflzr. l. c. 1379.—*H. bifurcum* M.B. Fl. taur.-cauc. II (1808) 251; Zahn in Pflzr. l. c. 1381.—*H. fallax* Willd. Enum. Berol. (1809) 822; Zahn, l. c. 1387.—*H. fockelianum* Touton and Zahn in Pflzr. l. c. p. 1389.—Hairs on stem (typically) antrorse and appressed; inflorescence mostly umbellate or at least at top umbellate, less often shallowly dichotomously paniculate.

1. Inflorescence paniculate or umbellate, mostly with many capitula, open or more or less compact; acladium 1–10% as long as stem.....2.
- + Inflorescence shallowly or deeply forked, with few (2–10) capitula; acladium 30–80% as long as stem.....17.
2. All leaves (except lowermost) glandular. Plants of Caucasus469. **H. maschukense** Litw. and Zahn
- + Leaves eglandular, only sometimes tips of upper cauline leaves with occasional glands (see *Cycle Fallacina*).....3.
3. Glands on involucre bracts and peduncles completely absent, sparse, or occasional.....4.
- 413 + Glands on involucre bracts and peduncles moderate to dense16.
4. Glands on involucre bracts and peduncles completely absent.....5.
- + Glands on involucre bracts and peduncles sparse or occasional.....9.
5. Involucre bracts to densely pubescent.....6.
- + Involucre bracts with scattered pubescence.....7.
6. Leaves moderately stellate-hairy above but to very densely so beneath; cauline leaves 5–10; inflorescence with 5–15 capitula; acladium very short, 3–4 mm long.....470. **H. proceriforme** N.P.
- + Leaves with stellate hairs almost absent above, but dense beneath; cauline leaves 12–16; inflorescence with 20–66 capitula; acladium 15–35 mm long; involucre bracts quite narrow.....471. **H. macrocymum** N.P.

7. Stellate hairs absent above on leaves (or occasional stellate hairs along midrib), very dense beneath; peduncles pubescent.....8.
 + Stellate hairs more or less dense on both sides of leaves; peduncles glabrous.....474. **H. asiaticum** N.P.
8. Acladium 25–50 mm long; coefficient of leafiness 0.13.....472. **H. freynii** N.P.
 + Acladium 10–20 mm long; coefficient of leafiness 0.20.....473. **H. echioides** Lumn.
- 9 (4). Leaves stellate-hairy on both sides; more or less sparse above, dense beneath.....10.
 + Leaves without stellate hairs above, but moderately stellate-hairy beneath.....15.
10. Stem simple.....11.
 + Stem branched.....14.
11. Basal leaves withering before anthesis. Plants of Soviet Central Asia.....475. **H. kumbelicum** B. Fedtsch. and Nevski
 + Basal leaves present at anthesis.....12.
12. Glands on peduncles absent. Plants of Caucasus.....476. **H. sachokianum** Kem.-Nat.
 + Glands on peduncles occasional to sparse.....13.
13. Leaves densely pubescent. Plants of Eastern Siberia.....477. **H. sabinopsis** Ganesch. and Zahn
 + Leaves moderately pubescent.....478. **H. durisetum** N.P.
- 14 (10). Cauline leaves 5–8 (coefficient of leafiness 0.12); peduncles and leaves sparsely pubescent (leaves almost glabrous above); acladium to 50 mm long (8% as long as stem). Plants of Urals.....479. **H. permense** Zahn
 + Cauline leaves 2–5 (coefficient of leafiness 0.07), peduncles moderately pubescent; leaves with scattered to moderate pubescence; acladium 6–16 mm long (2% as long as stem).....480. **H. fallax** (Willd.) N.P.
- 15 (9). Involucres 7.5–8.5 mm long; peduncles sparsely pubescent; acladium 6–16 mm long (3% as long as stem).....481. **H. albocinereum** Rupr.
 + Involucres 8–10 mm long; peduncles to moderately pubescent; acladium 20–50 mm long (7% as long as stem).....482. **H. rothianum** Zahn
- 16 (3). Involucres 6–7 mm long; capitula 10–35; acladium 5–22 mm long (3% as long as stem).....483. **H. subfallaciforme** Zahn
 + Involucres 8–9 mm long; capitula 3–10; acladium to 40 mm long (10% as long as stem). Plants of Eastern Siberia.....484. **H. tephrochlorellum** Ganesch. and Zahn

- 17 (1). Stolons absent.....18.
 + Stolons present.....19.
 18. Hairs on peduncles scattered; leaves narrow (9:1), pubescence scattered. Plants of Western Siberia.....485. **H. pineum** Schischk. and Serg.
 + Hairs on peduncles absent or occasional; leaves broader (5:1), pubescence sparse. Plants of Ladogo-Ilmen District.....486. **H. peczoryense** Juxip
 19. Inflorescence strongly dichotomous; acladium 10–15 mm long (8% as long as stem). Involucres 8–9 mm long; involucre bracts moderately glandular. Cauline leaves 1. Plants of Caucasus.....487. **H. frickii** Zahn
 + Inflorescence more or less deeply forked; acladium 35–80% as long as stem.....20.
 20. Acladium 35–55% as long as stem, i.e., 1/3 to 1/2 of stem length.....21.
 + Acladium about 80% as long as stem; involucres 8.0–8.5 mm long; cauline leaves absent; peduncles moderately glandular; basal leaves sparsely pubescent; ligules with red teeth. Plants of Caucasus.....491. **H. szovitsii** N.P.
 21. Basal leaves moderately pubescent; hairs on involucre bracts moderately long, 2 mm, dark; floral bracts light-colored; Crimean-Caucasian endemic.....488. **H. longipes** C. Koch ex N.P.
 + Basal leaves sparsely pubescent; hairs on involucre bracts and peduncles scattered or more or less absent.....22.
 22. Involucre bracts with broad and light-colored border, with light-colored, short hairs 0.5 mm long489. **H. vindobonae** Zahn
 + Involucre bracts more or less without border, with dark hairs, 1.5 mm long.....490. **H. sterromastix** N.P.

Cycle 1. **Maschukensia** Juxip.—*H. maschukense* Litw. and Zahn in Fedde, Repert. III (1907) 182; Pflzr. IV, 280, 1372; Grossh. Fl. Kavk. IV, 276.—*H. echioides* (vel *caucasicum*)-*verrulatum*, Zahn, l. c.—
 415 *H. incanum-caucasicum* Zahn, l. c.—Whole plant densely setose (bristles 1.0–3.5 mm long) and scattered-glandular throughout; phylogenetic significance of this form is not entirely clear; large number of glands particularly on leaves (excluding lowermost leaves) indicates the involvement of *H. incanum* M.B. in its evolution.

469. **H. maschukense** Litw. and Zahn in Fedde, Repert. III (1907) 183; Pflzr. IV, 280, 1372; Grossh. Fl. Kavk. IV, 276.

Perennial. Stem 60–90 cm high, 1.5–3.0 mm in diameter, fleshy, sulcate, with hairs quite dense, 2–4 mm long at base, decreasing upward to scattered; with sparse glands above, in upper part to middle of stem to densely stellate-hairy. Basal leaves withering before anthesis or 1–2, oblong-lanceolate, long-tapered to base (to 22 cm long); cauline leaves 7–14 (coefficient of leafiness 0.14), lower resembling basal leaves, other leaves gradually becoming smaller, more narrow, sessile, with broad base or most often somewhat amplexicaul, upper leaves linear, yellowish- or grayish-green, on both sides moderately hairy with hairs 1.5–3.0 mm long, with scattered stellate hairs above, but densely stellate-hairy beneath, all leaves except lower ones sparsely glandular. Inflorescence openly umbellate or more or less paniculate, with 20–50 capitula; acladium 10 mm long; peduncles with sparse to scattered hairs 1.0–2.5 mm long and scattered to sparse glands, white tomentose; floral bracts gray. Involucres 7.5–8.0 mm long, cylindrical-ovate; involucre bracts narrow, subacute, dark, with distinct green border, scattered to moderate pubescence with light-colored hairs 1–2 mm long, scattered to sparse glands, stellate hairs scattered, dense at base. Corollas dark yellow. Flowering June to August.

Dry places and scrubs to middle montane zone.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. *General distribution*: Balkans-Asia-Minor (eastern part), Armenia-Kurdistan. Endemic. Described from Mashuk (in vicinity of Pyatigorsk). Type unknown.

Note. Apparently, *H. caucasiciforme* Litw. and Zahn (*Fedde, Repert.* III, 183; *Pflzr.* IV, 280, 1373) should be referred here. It is distinguished by its shorter hairs, fewer stellate hairs and eglandular leaves and by its involucre bracts, peduncles, and stem having occasional to barely sparse glands in upper part.

Cycle 2. Proceriformia Juxip.—*H. proceriforme* N.P. Hier. *Mitteleur.* I (1885) 482, 486 pro ssp.; Zahn in *Pflzr.* IV, 280, 1369; Fedtsch. and Flerow, *Fl. Evrop. Ross.* (1910) 1085.—*H. echioides-procerum* Zahn.—In habit and most characters resembling *H. echioides* Lumn. but inflorescence compact corymbose-umbellate, with 5–15 capitula, its branches not longer than quite short acladium; numerous, quite long (4–10 mm long), antrorse hairs on stem.

- 416 470. **H. proceriforme** N.P. Hier. *Mitteleur.* I (1885) 487; Zahn in *Pflzr.* IV, 280, 1370; Asch. and Graebn. *Synopsis*, XII, I, 263.

Perennial. Stem 20–50 cm high, 1.5–2.0 mm in diameter, whole stem covered with very dense, antrorse (spreading upward), bristles 4–10 mm long, eglandular, densely stellate-hairy. Basal leaves withering

before anthesis; cauline leaves 8–14 (coefficient of leafiness 0.25), lower oblong, roundish-obtuse, mostly marcescent, others narrowly lanceolate, acute, yellowish-green, on both sides densely setose with stiff, bristles 3–5 mm long, to moderately stellate-hairy above, densely so (grayish) beneath. Inflorescence densely umbellate, with 5–15 capitula; acladium quite short, 3–4 mm long; peduncles with dense, hairs 1.5–2.5 mm long, eglandular, white-tomentose; floral bracts gray. Involucres 7–8 mm long; cylindrical-ovate; involucre bracts quite narrow, somewhat acute, dark gray, with narrow, pale border, densely to moderately pubescent with hairs 1.5–2.5 mm long, eglandular, densely stellate-hairy. Corollas light yellow. Stigmas yellow. Flowering June to July.

Dry mountain slopes.—*European Part*: Crimea. *General distribution*: Balkans-Asia Minor (western part). Described from Crimea. Type in Munich.

Note. Apparently, we have to treat the Crimean plants of *H. procerum* Fr. as *H. proceriforme* N.P. as well as the plants from the southeastern European Territory of the Soviet Union, which were considered as *H. procerum* by S. Nevski (*Fl. Yugo-vost. Evrop. Ch. SSSR*, VI, 480).

H. malacotrichum N.P. (*Hier. Mitteleur.* I, 487; *Pflzr.* IV, 280, 1370), a species endemic to Crimea (Sudak, Koshka), closely approaches *H. proceriforme*, from which it is distinguished by softer bristles, gray-green leaves, longer (10 mm long) acladium, and larger capitula (involucres 8–9 mm long). Described from the vicinity of Sudak. Type in Munich.

Cycle 3. *Macrocyra* Juxip.—*Grex Macrocyrum* N.P. *Hier. Mitteleur.* I (1885) 482; *Zahn in Pflzr.* IV, 280, 1368, pro subgrex.—Inflorescence large-umbellate, with long, divergent branches, considerably longer than more or less long acladium (15–)20–40 mm long; plants tall, more or less densely pubescent; hairs antrorse (not appressed as in species of *Echioidea*).

471. ***H. macrocyrum*** N.P. *Hier. Mitteleur.* I (1885) 483; *Zahn in Pflzr.* IV, 280, 1368; *Asch. and Graebn. Synopsis*, XII, I, 262.—**Exs.**: *Fries, Hier. Europ. exs. No. 38* (sub *Pilosella echioides* Fr.).

Perennial. Stem 50–75 cm high, 3–5 mm in diameter, with numerous light-colored, antrorse bristles 3–10 mm long at base, less numerous upward and more or less dark and widely spaced above, eglandular, densely stellate-hairy. Basal leaves mostly withering before anthesis; cauline leaves 12–16 (coefficient of leafiness 0.23), narrowly lanceolate, obtuse to acute, yellowish-gray-green, on both sides densely setose with thin bristles 3–6 mm long, almost without stellate hairs above

(only occasional stellate hairs along midrib), strongly downy beneath (to grayish). Inflorescence openly, large-umbellate, with 20–65 capitula; acladium 15–35 mm long; peduncles moderately hairy, eglandular, white- or gray-tomentose; floral bracts gray. Involucres 7.5–8.0 mm long, ovate-subglobose; involucre bracts very narrow, acute, gray, without border, with dense, light-colored hairs 1–2 mm long, eglandular, gray from hairs. Corollas yellow. Stigmas yellow. Flowering June to July.

Dry sandy places.—*European Part*: Lower Don Region (Sarepta); *Caucasus*: Eastern Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Pomerania (Germany). Type in Munich.

472. *H. freynii* N.P. Hier. Mitteleur. I (1885) 483; Zahn in Pflzr. IV, 280, 1368; Asch. and Graebn. Synopsis, XII, I, 262.—*Exs.*: F. Schultz, Herb. norm. cent. III, No. 288 (sub *H. echiioides* var. *arenaria*); GRF No. 2220 p. p.

Perennial. Stem 50–90 cm high, 2–3 mm in diameter, to dense, light-colored hairs 3–5 mm long at base, strongly decreasing upward, with occasional hairs above or glabrous, eglandular, densely stellate-hairy in lower part, less dense upward. Basal leaves mostly withering before anthesis; cauline leaves 8–10 (coefficient of leafiness 0.13), lanceolate to narrowly lanceolate, subobtusely, grayish-green, to moderately setose with thin bristles 2–3 mm long or with numerous bristles 3–5 mm long (var. *multipilum* N.P.), stellate-hairy above only along midrib, with scattered to very dense hairs beneath. Inflorescence openly, large-umbellate, with 30–35 capitula; acladium 25–50 mm long; peduncles with scattered to sparse hairs below capitula, without simple hairs below, eglandular, white- or gray-tomentose; floral bracts dark. Involucres 7–8 mm or 8–9 mm long (var. *multipilum* N.P.); involucre bracts narrow, subacute, blackish-gray, with narrow, light-colored border, with scattered, light-colored hairs 1.0–1.5 mm long or with moderate hairs 2.0–2.5 mm long (var. *multipilum* N.P.), eglandular or with occasional glands at tips of bracts, gray from pubescence. Corollas golden yellow. Stigmas yellow. Flowering June to July.

Sandy escarpments.—*Central Asia*: Aralo-Caspian Region (Ber-Chogur in Mugodzhary Mountains). *General distribution*: Central Europe, Balkans-Asia Minor. Described from Hungary. Type in Munich.

Note. The plants issued in the GRF as No. 2220 (and collected in Mugodzhary Mountains) do not conform to the original diagnosis of the species and in fact are not at all distinguishable from *H. echiioides* (Lumn.) N.P. Therefore, *H. freynii* N.P. should be considered (until confirmation) as an element of the flora of the USSR only with reservation.

418 *Cycle 4. Echioidea Juxip.*—*H. echioides* Lumn. Fl. Poson. 1 (1791) 348; M.B. Fl. taur.-cauc. II, 253; Ldb. Fl. alt. IV, 128; Froel. in DC. Prodr. VII, 206; Ldb. Fl. Ross. II, 849; Fr. Symb. 33; Epicr. 39; Boiss. Fl. or. III, 864; N.P. Hier. Mitteleur. I, 482; sub grex *Echioides*: Schmalh. Fl. II, 159; Fedch. and Flerov, Fl. Evrop. Ross. 1085; Zahn, Hier. Fl. Mosquens. 31; Pflzr. IV, 280, 1368; Asch. and Graebn. Synopsis, XII, I, 261; Grossh. Fl. Kavk. IV, 276; Nevski in Fl. Yugo-Vost. VI, 479; Krylov, Fl. Zap. Sib. XI, 3068.—Inflorescence small, umbellate, dense or only somewhat open, branches mostly as long as average length (8–20 mm long) of acladium or only slightly longer. Plants more or less tall, more or less thick or slender, densely covered with antrorse, appressed hairs.

473. **H. echioides** Lumn. Hier. Mitteleur. I (1885) 484; Zahn, Hier. fl. Mosquens. 32; Pflzr. IV, 280, 1368; Asch. and Graebn. Synopsis, XII, I, 262, sub *H. eu-echioides* Zahn.—**lc.**: Syreistsh. Fl. Mosk. Gub. III, 356.—**Exs.**: Hier. Naeg. Nos. 33, 126, 233, 255; Zahn, Hier. Europ. Nos. 216, 423, 424, 835; GRF Nos. 1267a, b, 1816, 1817, 2071a, b; 2216–2219.

Perennial. Stem 15–100 cm high, 1.5–5.0 mm in diameter, flexuous, fleshy, at base to densely covered with antrorse (in typical forms even appressed), stiff, light-colored bristles 2–5 mm long, decreasing upward and at top sparse, eglandular, densely stellate-hairy. Basal leaves mostly withering before anthesis, but sometimes 1–3 leaves persisting, oblong, to 17 cm long (10:1); cauline leaves 5–13(–20) (coefficient of leafiness to 0.20), narrowly lanceolate to linear-lanceolate, with short, triangular, acuminate tip (thus forming shoulder-like structure at tip), more or less evenly distributed (long internode between 6th and 7th leaves), gradually reduced, stiff, moderately setose on both sides with stiff bristles 2–5 mm long, stellate hairs almost absent above (occasional stellate hairs only along midrib) to more or less scattered or dense (beneath); leaves glaucescent, but appear gray-green from dense hairs. Inflorescence densely umbellate, later becoming more open, with 10–30 (rarely more) capitula; acladium 10–20 mm long; peduncles sparsely to scatteredly hairy, eglandular, white-tomentose; floral bracts gray. Involucres (6–)7–8(–9) mm long, ovate, later subglobose; involucre bracts narrow, acute, whitish-gray, pubescence sparse to scattered, 26(20–40), light-colored hairs 1–3 mm long, eglandular (or at most with occasional glands at tips), whitish-tomentose (on old herbarium specimens involucres appear chestnut-colored). Corollas dark-yellow. Stigmas yellow. Flowering May to August. (Plate XXV, Fig. 1.)

419 Dry grassy slopes, in mountains to middle montane zone, in feathergrass steppes, on sands, stony soil, in dry valley meadows, along edges of dry forests, beyond steppe zone almost exclusively in

thin pine forests and on sands along large rivers.—*European Part*: All regions (except Arctic, Karelia-Lapland, Dvina-Pechora, and northern part of Baltic Region), Crimea; *Caucasus*: Ciscaucasia, Dagestan, Eastern and Western Transcaucasia; *Western Siberia*: Upper Tobol, Irtysh, Altai, Angara-Sayans; *Soviet Central Asia*: Aralo-Caspian Region, Lake Balkhash Region, Amu-Darya, Tien Shan, Pamiro-Alai. *General distribution*: Central Europe (eastern part), Balkans-Asia Minor, Armenia-Kurdistan, Iran, Dzhungaria-Kashgaria, Mongolia. Described from Poznan. Type in Munich.

Note. Because of its wide distribution, this species is quite polymorphic and is distinguished mainly by the nature of the pubescence: appressed or spreading, long or short hairs, and also by the number of cauline leaves, height of plants, and type of inflorescence.

In cultivation it survives with difficulty and often dies in the second year; Naegeli and Peter (*Hier. Mitteleur.* I, 482) have already reported this feature.

474. *H. asiaticum* N.P. Hier. Mitteleur. I (1885) 486; Zahn in Pflzr. IV, 280, 1369.—**Exs.**: GRF No. 2070.

Perennial. Stem 25–50 cm high, 1.5–3.0 mm in diameter, at base moderately covered with antrorse, light-colored bristles (0.5–)1–2 mm long, sharply decreasing upward and sparse at top, eglandular, to densely stellate-hairy. Basal leaves absent at anthesis; cauline leaves 9–10 (coefficient of leafiness to 0.20), linear, acute, with stipules, grayish-green, with scattered bristles 1.0–1.5 mm long above, sparse beneath, with scattered to dense stellate hairs on both sides. Inflorescence very openly umbellate, with 12–30 capitula; acladium 10–12 mm long; peduncles without simple hairs and eglandular, gray-tomentose; floral bracts light gray. Involucre 6–7 mm long, ovate, later subglobose; involucre bracts narrow, acute, with sparse (10–16) light-colored, short hairs to 1 mm long, eglandular, white-pubescent. Corollas light yellow. Stigmas yellow. Flowering June to August.

Dry meadows to middle montane zone.—*European Part*: Crimea; *Caucasus*: Ciscaucasia, Eastern and Western Transcaucasia; *Western Siberia*: Irtysh, Altai; *Soviet Central Asia*: Dzhungaria-Tarbagtai. Endemic. Described from Altai. Type in Munich.

Note. Possibly, *H. multifolium* Peter (in Nachr. K. Ges. Wiss. Götting. 2 (1893) 71; Zahn, *Hier.Fl. Mosquens* 32; Pflzr. IV, 280, 1369).—*H. leucocephalum* Rupr. in Kauffm. *Adnot. bot.*, 1868; nec Vukot.) should be referred to this species. It is distinguished from *H. asiaticum* N.P. by the presence of occasional hairs on the peduncles, denser and longer pubescence on the stem (hairs 4–6 mm long) and leaves, bristles 3–4 mm long, taller (60–80 cm high) plants, and consequently by a

larger number of cauline leaves (12–15) and almost equal coefficient of leafiness (0.20).

- 420 **Cycle 5. *Fallacina* Juxip.**—*H. fallax* Willd. Enum. Berol. (1809) 822; N.P. Hier. Mitteleur. I, 514, 819; Zahn in Pflzr. IV, 280, 1387; Grossh. Fl. Kavk. IV, 278.—*H. echioides-cymosum* N.P. l. c.—Without stolons but usually with developed runners which initially are stolon-like, or with underground, slender, pale shoots forming rosette at tip (in weak plants these may also be absent); plants with glands on involucre bracts, peduncles, and top of stem (but sometimes even on upper leaves); cauline leaves 2–10; inflorescence openly umbellate to more or less paniculate; corollas and stigmas yellow; in characters sometimes approaches *H. echioides* Lumn. (coll.) and sometimes *K. vaillantii* Tausch.

Note. The members of *Fallacina* are often considered to be hybrid species between subsection *Echioidea* and section *Cymosina*, which is confirmed by the combination of morphological characteristics of both the components, as well as by the relatively rare occurrence of the species of this cycle. However, even if this hypothesis is true in the case of the species of Central Russian or Eastern Central European origin where, as is well known, *Echioidea* and *Cymosina* occur together, then it fails completely to explain the origin of the *Fallacina* species in the Caucasus (and in Armenia-Kurdistan and the Iranian region), where *Cymosina* is entirely absent, and in the Scandinavian region, where *H. echioides* Lumn. is absent. In this connection, Naegeli and Peter (*Hier. Mitteleur.* I, 515) have put forth two hypotheses: 1) that the species of *Fallacina* (*H. fallax* Willd. col.) probably evolved from an extinct primitive type from which *Echioidea* and *Cymosina* also developed later in parallel, or 2) that representatives of *Echioidea* and *Cymosina* probably had a wider range in the past than now, and later, after its contraction, their hybrid forms persisted both in the Caucasus and in Scandinavia as relicts. The relict nature of the species is also confirmed by the disjunctions of their range.

475. ***H. kumbelicum*** B. Fedtsch. and Nevski in Tr. Bot. Inst. Akad. Nauk SSSR, 1, I (1933) 209.

Perennial. Stem 30–60 cm high, 1.5–4.0 mm in diameter, densely covered at base with white, antrorse, flexuous, bristles 4–5 mm long, less dense upward and rare at top, eglandular, densely stellate-hairy, without stolons. Basal leaves mostly withering before anthesis; cauline leaves 5 (coefficient of leafiness 0.13), lanceolate, acuminate, to 9 cm long, gradually reduced, on both sides moderately hairy with hairs 1.5–2.5 mm long, stellate-hairy on both sides. Inflorescence densely

umbellate, with 9–24 capitula; acladium short (2–5 mm long); peduncles sparsely hairy, eglandular, white-tomentose. Involucres 7.0–7.5 mm long; involucre bracts narrow, acuminate, with scattered, 40(25–70), light-colored hairs 2–3 mm long and occasional, 6(3–10) glands at tips of bracts 0.2–0.3 mm long, densely stellate-hairy. Corollas light yellow. Flowering July to August.

421 Alpine meadows.—*Soviet Central Asia*: Tien Shan. Endemic. Described from vicinity of Alma-Ata (Kum-Bel Mountains). Type in Leningrad.

Note. The authors of this species consider it as an intermediate species between *H. echioides* Lumn. and *H. dublitzkii* B. Fedtsch. and Nevski, which is found along with the latter. It is distinguished from *H. echioides* by having more or less erect hairs, slightly glandular involucre bracts, and soft leaves. The species was established on the basis of only a single specimen, collected late and badly prepared; therefore, we propose to consider the plant collected by B.K. Schischkin near the Village of Sarydzhas on July 26, 1935, as the type (preserved in Leningrad).

476. *H. sachokianum* Kem.-Nat. in Fl. Gruzii, VIII (1952) 755; Zamp. po Sist. i Geogr. r. Tbil. Bot. Inst. 17, 132, em. Juxip.

Perennial. Stem 15–50 cm high, 1–2 mm in diameter, moderately hairy at base with erect hairs 2.5 mm long, thinning upward and occasional at top, eglandular, stellate-hairy throughout, pubescence dense above, without stolons. Basal leaves (3–)4–5(–7), lanceolate, to 9 cm long (4–7:1), subobtusely to acute, with dense hairs 3.5–5.0 mm long above and very dense hairs 2.5 mm long beneath and along midrib below, hairs scattered along margin, as a whole very densely hairy, stellate hairs very rare above but moderate beneath; cauline leaves 2–3(–4) (coefficient of leafiness 0.08), in lower third of stem, smaller, lanceolate, acute, with hairs 4–6 mm long above, as a whole to densely hairy, with sparse stellate hairs above but moderate beneath. Inflorescence densely umbellate, with 13–20 capitula; acladium 5–10 mm long; peduncles with sparse, light-colored hairs 2.5 mm long, eglandular, gray-tomentose. Involucres 6–7 mm long, ovate; involucre bracts narrow, subobtusely, with moderate, 43(25–50), hairs 3 mm long, with occasional, 5(0–10), glands 0.2–0.3 mm long at tips of bracts, moderately to densely stellate-hairy. Corollas golden yellow. Stigmas yellow. Achenes to 2 mm long, black. Flowering July to August.

Subalpine zone, saline juniper forest.—*Caucasus*: Western Transcaucasia, Talysh. Endemic. Described from Svanetia. Type in Tbilisi; cotype in Leningrad.

477. **H. sabinopsis** Ganesch. and Zahn in Tr. Pochv.-Bot. E'ksp. 1909, II, 5 (1912) 150; Pflzr. IV, 280, 1388.

Perennial. Stem 30–50 cm high, 1.5–2.0 mm in diameter, flexuous, very densely covered at base with erect, white bristles 2.0–3.5 mm long, less dense above, glands only at top, sparse, densely stellate-hairy, stolons absent. Outer basal leaves obovate-lobed, obtuse, others larger, broadly lanceolate and subobtuse or lanceolate, acute, yellowish-green, on both sides to densely covered with bristles 1.0–2.5 mm long, and with scattered stellate hairs above, denser
422 beneath; cauline leaves 3–5 (coefficient of leafiness 0.10), abruptly reduced, on both sides densely stellate-hairy. Inflorescence more or less compactly umbellate, with 15–30 capitula; acladium short; peduncles with scattered simple hairs, and occasional glands, white-tomentose. Involucres 6–7 mm long, cylindrical-ovate; involucral bracts somewhat narrow, somewhat dark with narrow green border, densely covered with white bristles 1.5–2.0 mm long having dark base, with occasional glands, very densely stellate-hairy. Corollas dark yellow. Flowering June to July.

Steppe slopes.—*Eastern Siberia*: Angara-Sayans. Endemic. Described from Balagan District (Irkutsk Region). Type in Leningrad?

478. **H. durisetum** N.P. Hier. Mitteleur. I (1885) 516; Zahn, Hier. fl. Mosquens. 34; Pflzr. IV, 280, 1388; Asch. and Graebn. Synopsis, XII, I, 279.—*H. collinum* Gochn. Tent. pl. Cichor. (1808) 17, t. 1; nec N.P. et al.—*Ис.*: Syreistsch. Fl. Mosk. Gub. III, 356.—*Exs.*: GRF No. 2221; Zahn, Hier. Europ. No. 6.

Perennial. Stem 30–80 cm high, 1.5–2.5(–5.0) mm in diameter, somewhat flexuous, densely covered with bristles 2.0–4.5 mm long at base, less dense upward, and sparse at top, with occasional glands or eglandular above, densely stellate-hairy, without stolons but with runners looking at first glance like stolons, often with many stems. Basal leaves 2–10, more or less lanceolate, outer obtuse, inner subacute, to 20 cm long (10–17:1), yellow-green, with stiff bristles 2–4 mm long above, as a whole scattered-hairy, scatteredly stellate-hairy above, moderately beneath; cauline leaves 3–9 (coefficient of leafiness 0.11), linear, acute, moderately stellate-hairy above, densely so beneath, with occasional glands at tips of leaves. Inflorescence openly umbellate, with 10–35(–110) capitula; acladium 6–10 mm long; peduncles sparsely hairy and sparsely glandular, white-tomentose. Involucres 6.5–8.0 mm long, cylindrical; involucral bracts narrow, subacute, with scattered, 33(20–55), or to moderate pubescence of light-colored or dark bristles 1.5–2.5 mm long, with sparse to scattered, 17(10–30), glands 0.1–0.3

mm long, concentrated more toward tip, grayish-pubescent. Stigmas yellow. Flowering June to July.

Grassy and sandy places.—*European Part*: Baltic Region (southern), Ladoga-Ilmen (southern), Upper Volga, Upper Dnieper, Middle Dnieper regions; *Caucasus*: Eastern Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor (eastern part), Armenia-Kurdistan (?), Iran. Described from Thuringia. Type in Munich.

479. **H. permense** Zahn in Pflzr. IV, 280 (1923) 1389.

Perennial. Stem 50–60 cm high, very densely covered at base with long bristles, thinning and shortening upwards, with occasional small glands, very densely stellate-hairy; offshoots filiform, slender, pale, underground. Basal leaves numerous, long, elliptical, oblong-lanceolate, 423 attenuate to long petiole, subobtusate, more or less glabrous above, with long scattered bristles along margin and beneath, somewhat stellate-hairy above, very densely so beneath, often reddish-violet beneath; cauline leaves 5–8 (coefficient of leafiness 0.12), in lower half of stem, lower leaves approximate, long-lanceolate, others scattered, narrowly lanceolate to linear, densely stellate-hairy (ash-gray beneath). Inflorescence quite openly cymose, multicapitate; acladium long, to 50 mm long, 1–2 lower branches remote, long; peduncles with sparse hairs and sparse glands, gray-tomentose. Involucres ovate; involucral bracts somewhat narrow and acute, inner with light-colored border, to moderately short-pubescent, with sparse glands, grayish-pubescent. Corollas yellow. Flowering June to July.

European Part: Volga-Kama Region. Endemic. Described from the Talits plant, collected by I. Shell. Type unknown.

480. **H. fallax** (Willd.) N.P. Hier. Mitteleur. I (1885) 516; Zahn in Pflzr. IV, 280, 1389; Asch. and Graebn. Synopsis, XII, I, 280, sub *H. eu-fallax* Zahn, nec al.—**Exs.**: GRF No. 1818.

Perennial. Stem 30–60 cm high, 2–3 mm in diameter, at base very densely covered with slightly antrorse bristles 1.3 mm long, thinning greatly upwards, with sparse glands at top, decreasing downward (with occasional scattered glands almost down to base), more or less densely stellate-hairy; offshoots very slender, short, often underground, pale (may be absent in weak plants but in cultivation they certainly develop); often many stems from single rhizome. Basal leaves 3–5, oblong or lanceolate, subacute to acute or narrowly lanceolate (var. *angustius* Zahn), to 15 cm long (13–20:1), light green, on both sides with scattered to moderate hairs, with bristles 3–4 mm or 0.5–1.0 mm long (var. *angustius* Zahn) above, with soft hairs beneath, with sparse or occasional stellate hairs above, moderate beneath; cauline leaves

2–4 (or 3–5, var. *angustius* Zahn) (coefficient of leafiness 0.07), but on secondary stems often even more—to 7 or 8, lanceolate, acute on both sides stellate-hairy, scattered-glandular at tips. Inflorescence quite openly umbellate-paniculate, with 10–35 capitula; acladium 6–16 mm long; peduncles with occasional hairs and occasional glands, gray-tomentose; floral bracts gray or dark. Involucres 6–8 mm long, cylindrical-ovate; involucre bracts narrow, acute, blackish, with occasional, 11(8–14), light-colored hairs 1.0–1.5 mm long, with sparse, 5(8–18), glands 0.3–0.4 mm long, more or less concentrated at tip, very densely (but along margin sparsely) stellate-hairy. Corollas more or less light yellow. Flowering June to July.

Sandy places and escarpments.—*European Part*: Ladoga-Ilmen, Upper Volga; *Caucasus*: Eastern and Western Transcaucasia. *General distribution*: Central Europe. Described from Saxony. Type in Berlin?

424 **Note.** The disjunct distribution of this species is quite remarkable (see note to *Fallacina*).

Cycle 6. Setigera Juxip.—*H. rothianum* Wallr. Sched. crit. I (1822) 417; Zahn in Pflzr. IV, 280, 1379; Asch. and Graebn. Synopsis, XII, I, 268.—*H. setigerum* Tausch in Flora, XI, Erg.-Bl. (1828) 61; Fr. Symb. 32; N.P. Hier. Mitteleur. I, 494, 817.—*H. setigerum* β . *rothianum* and γ . *multicaule* Froel. in DC. Prodr. VII (1838) 206.—*H. albocinereum* Rupr. Fl. Ingr. (1860) 638; non Fr., nec N.P.—*H. brachiatum* b. *hispidissimum* Fr. Epicr. (1862) 17.—*H. echioides* > *Pilosella* N.P. l. c.—*H. echioides* > *pilosella* Zahn in Pflzr. l. c.—Rhizome with lateral shoots and runners; inflorescence quite openly paniculate, partly with remote branches, at top umbellate, with acladium of quite variable length: 6–50(–150) mm long; average coefficient of leafiness 0.14, cauline leaves 4–10; leaves without or with sparse stellate hairs, above, grayish beneath; pubescence conspicuous throughout, long, setose, erect on stem, glands absent or sparse; corollas and stigmas yellow.

Fits the formula *H. echioides* > *pilosella*, but it is doubtful whether it is a hybrid, as it occurs far beyond the limits of distribution of the supposed progenitors (compare *H. pineum* Schischk. and Serg.).

481. **H. albocinereum** Rupr. Fl. Ingr. (1860) 638; Fr. Epir. 40 in nota; Meinsh. in Bull. Soc. Nat. Mosc. II, 357, 374 and Fl. Ingr. 201; nec Celak. (1871); Zahn in Pflzr. IV, 280, 1381; Asch. and Graebn. Synopsis, XII, I, 270.—*Pilosella ruprechtii* Arv.-Touv., Essai classific. Pilos. and Hier. (1880) 4.—*H. luganum* N.P. Hier. Mitteleur. I (1885) 499.—**Exs.**: GRF No. 2051.

Perennial. Stem 20–30(–50) cm high, 1–2 mm in diameter, with scattered, antrorse, bristles 3–4 mm long at base, decreasing upward,

eglandular, densely white-pubescent throughout, often 3–5 stems, without stolons. Basal leaves 2–15, lanceolate to narrowly lanceolate, obtuse to acute, to 15 cm long (10:1), glaucescently yellow-green, on both sides moderately setose with bristles to 4 mm long, bristles to 2.5 mm long along margin and beneath, softer, more or less without stellate hairs above or with isolated stellate hairs along midrib, densely stellate-hairy to transparent-tomentose beneath; cauline leaves 2–6 (coefficient of leafiness 0.10), linear (11:1), somewhat stellate-hairy above, transparent-tomentum beneath. Inflorescence quite openly (dichotomously) paniculate, with 5–20(–30) capitula; acladium 6–15 mm long; peduncles with sparse hairs and occasional glands, white-tomentose; floral bracts gray. Involucres 7.5–8.5 mm long, ovate, later subglobose; involucre bracts somewhat broad, acute, gray, with light-colored margin, pubescence scattered to dense, 40(25–50)75, with light-colored hairs 1.0–1.5(–4.0) mm long and occasional to sparse, 10(0–20), glands 0.2–0.3 mm long, whitish from stellate hairs. Corollas light yellow. Flowering June to July.

Edges of pine forests, on dry sands.—*European Part*: Baltic Region, Ladoga-Ilmen (south). Endemic? Described from vicinity of Luga. Type in Munich.

482. **H. rothianum** Zahn in Pflzr. IV, 280, (1923) 1379; Asch. and Graebn. Synopsis, XII, I, 268, sub *H. eu-rothianum* Zahn.—*H. setigerum* N.P. Hier. Mitteleur. I (1885) 496.—**Exs.**: Hier. Naeg. exs. Nos. 95, 159; F. Schultz. Herb. norm. nov. ser. No. 1606; Fl. Austr.-Hung. exs. No. 3032; Zahn, Hier. Europ. Nos. 119, 426, 527, 836; GRF Nos. 1291, 1292.

Perennial. Stem 30–75 cm high, 2–5 mm in diameter, flexuous, to densely covered at base with white and horizontally spreading, flexuous bristles 4–6 mm long (f. *seticaule* N.P.) or hairs greatly decreased or absent in upper part (f. *calvicaule* N.P.), with occasional glands above, rapidly thinning downward, with dense stellate hairs above, less dense below; without stolons, regeneration by sessile rosettes (but under cultivation it develops runner-like lateral stems). Basal leaves 0–6, broadly lanceolate or narrowly lanceolate (f. *angustum* N.P.), acute, glaucescent light green, to 15 cm long, on both sides pubescence sparse to scattered with bristles 3–7 mm long above and soft hairs beneath, usually without stellate hairs above but pubescence scattered to moderate beneath; cauline leaves 4–7(–10) (coefficient of leafiness 0.10), linear-lanceolate, quickly falling. Inflorescence openly paniculate, with 25(10–40) capitula; with long (20–50 mm) acladium; peduncles moderately hairy, with hairs 3–6 mm long, with, extremely sparse (none) glands, white-tomentose; floral bracts light gray. Involucres 8–10 mm long, cylindrical-ovate; involucre bracts

somewhat broad, acute, dark gray, with bright green border, pubescence to scattered, 27(20–30), with white or somewhat dark hairs 1–3 mm long, with sparse glands, or almost eglandular, gray from stellate hairs. Corollas light yellow. Stigmas yellow. Flowering June to July.

Dry sandy or stony places.—*European Part*: Ladoga-Ilmen (southern part), Upper Volga, Volga-Don regions; *Caucasus*: ?Southern Transcaucasia (known from former Artvin District). *General distribution*: Central Europe, Balkans-Asia Minor. Described from Austria. Type in Munich.

Cycle 7. Fallaciformia Juxip.—*H. fallaciforme* Litw. and Zahn in Sched. ad HFR XLII (1910) 11; nec Dahlst.—Glands on involucre bracts and peduncles to numerous (in contrast to *Fallacina*, where they are only sparse to occasional).

483. **H. subfallaciforme** Zahn in Pflzr. IV, 280 (1923) 1390.—*H. fallaciforme* Litw. and Zahn in Sched. ad HFR XLII (1910) 11, non Dahlst.—*Exs.*: GRF No. 2075.

426 Perennial. Stem 25–40(–70) cm high, 2–3 mm in diameter, noticeably covered at base with antrorse, light-colored bristles 2–3 mm long, thinning upward, with occasionally to sparse glands, conspicuously stellate-hairy, without stolons, regeneration by sessile rosettes. Basal leaves 6–8, oblong-lanceolate to lanceolate, subobtuse to acute, to 14 cm long (7:1), yellow-green, moderately setose above with bristles 2.0–2.5 mm long, moderately so also beneath with hairs 1.5 mm long, denser along midrib, as a whole moderately hairy, without stellate hairs above, grayish beneath; cauline leaves 2–3(5) (coefficient of leafiness 0.06), in lower part of stem, quickly falling, sparsely stellate-hairy above, slightly tomentose beneath from stellate hairs, sometimes with occasional glands beneath. Inflorescence openly paniculate, with umbellate tip, with (6–)10–25(–35) capitula; acladium 5–22 mm long; peduncles glabrous or with occasional hairs, to moderately glandular, gray-tomentose; floral bracts dark, with green border. Involucres 6–7 mm long, ovate; involucre bracts somewhat broad, acute, dark gray, scarcely green-bordered, glabrous (or with occasional hairs), with moderate, 43(38–46), glands 0.3 mm long, slightly grayish from pubescence. Corollas dark yellow, without stripes. Flowering June to July.

Edges of pine forests, on sandy soil.—*European Part*: Ladoga-Ilmen, Baltic Region, Upper Volga, Volga-Don. Endemic. Described from Kalinin Region. Type in Leningrad.

484. **H. tephrochlorellum** Ganesch. and Zahn in Tr. Pochv.-Bot. E'ksp. Peresel. Upr. 1909, II, 5 (1912) 150; Pflzr. IV, 280, 1390.

Perennial. Stem 25–50 cm high, 1.0–2.5 mm in diameter, very densely setose at base with white bristles 2.0–3.5 mm long, less dense upward and at top sparsely hairy (or more or less without simple hairs), but then densely glandular and densely stellate-hairy; without stolons. Basal leaves 3–4, outer obovate-lobed, obtuse, inner lanceolate, subacute to acute, yellowish-green, to 8 cm long (8–11:1), on both sides with scattered bristles 2.0–3.5 mm long, sparsely tomentose above, and slightly so beneath; cauline leaves 2–4 (coefficient of leafiness 0.07), quickly falling, on both sides densely stellate-hairy. Inflorescence openly paniculate, with umbellate tip and 3–16 capitula; acladium to 40 mm long; peduncles with occasional hairs but very sparsely glandular, gray-tomentose. Involucres (7–)8–9 mm long, ovate, later flattened-torulose, with truncate base; involucral bracts somewhat broad, acute, dark, with scarcely light-bordered, with occasional hairs and scattered, 40(35–45), glands 0.6–1.0 mm long, stellate pubescence mainly at base of bracts, more or less sparse. Corollas yellow, without stripes. Stigmas yellow. Flowering June to July.

- 427 Pine forests.—*Western Siberia; Eastern Siberia*: Angara-Sayans. Endemic. Described from Balagan District (Irkutsk Region). Type in Leningrad.

Note. The present plant, collected by S.S. Ganeschin from Siberia, was initially treated by Zahn as a subspecies of *H. heterodoxum* Tausch., which he considered as the hybrid *H. fallax* > *pilosella* (1912). But later (1923) he treated *H. heterodoxum* Tausch as the hybrid *H. calodon* > *pilosella* and referred *H. tephrochlorellum* to *H. fockelianum* Touton and Zahn (*Pflzr.* IV, 280, 1389). The latter, in his opinion, is *H. fallax* > *pilosella*. Without going into the problem of how much the Central European *H. fockelianum* resembles our species *H. tephrochlorellum* and *H. fallaciforme*, it is impossible not to doubt the involvement of *H. pilosella* L. in the evolution of these species, particularly the Eastern Siberian *H. tephrochlorellum*, because *H. pilosella* does not grow there.

H. tephrochlorellum is distinguished from the undoubtedly related *H. fallaciforme* by having fewer capitula, larger involucres, and a long acladium. It replaces *H. subfallaciforme* Zahn in Siberia.

Cycle 8. Cinerea Juxip.—Grex *H. cinereum* (Tausch.) Zahn ex parte in *Pflzr.* IV, 280 (1923) 1381; Asch. and Graebn. Synopsis, XII, I, 271.—*H. bifurcum* (M.B.) N.P. Hier. Mitteleur. I (1885) 505 in nota.—*H. pilosella* + *setigerum* Hausskn. in Mitt. Bot. Ges. Thüring (1887) 28.—Stolons usually absent, quite rarely short and thick; ligules almost always yellow (without red stripes outside); often developing

collateral stems and runners; leaves densely stellate-hairy beneath. Quite close to *Setigera*.

485. **H. pineum** Schischk. and Serg. in Sistem. Zam. po Mat. Gerb. im. Krylova pri Tomsk Univ. 1-2 (1949) 24; Krylov, Fl. Zap. Sib. XI, 3065, em Juxip.

Perennial. Stem 20-40 cm high, sometimes with 1-2 collateral stems, with thin, antrorse hairs 5 mm long, eglandular, with stellate hairs, more dense at top; without stolons. Basal leaves 3-12, outer oblong-ovate or elliptical, obtuse or subobtuse, inner lanceolate, acute, all leaves yellowish-green, sometimes violet beneath, up to 11 cm long (9:1), with hairs 3-5 mm long above and along margin, rarer beneath, without stellate hairs above but densely hairy beneath; cauline leaves (1-)2 (coefficient of leafiness 0.5), in lower half of stem, lanceolate, acute. Inflorescence spreading-dichotomous, with (2-)4-10 capitula; peduncles distinctly pilose, eglandular or with occasional glands, grayish from pubescence. Involucres 7-8 mm long, cylindrical; involucral bracts, narrow, acute, with moderate (50), black-based light-hairs 2.5 mm long, with occasional (6) glands or eglandular, with scattered stellate hairs. Ligules yellow, without stripes. Stigmas yellow. Achenes to 2 mm long. Flowering June to August.

428 Forest edges and glades in pine forests and on ridges.—*Western Siberia*: Ob Region, Altai. Endemic. Described from vicinity of Barnaul. Type in Tomsk; cotype in Leningrad.

486. **H. peczoryense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 526.

Perennial. Stem 30-35 cm high, 1.5-2.0 mm in diameter, with collateral stems, at base sparsely hairy, without [simple] hairs upward, eglandular, densely stellate-hairy, without stolons. Basal leaves to 8, lanceolate, attenuate to long petiole, to 8 cm long (5:1), lamina broadened toward tip and then short-acuminate, as a whole sparsely pubescent with hairs 3-4 mm long, with bristles 8-9 mm long above and without stellate hairs; densely stellate-hairy (grayish) beneath; cauline leaves 2-3 (coefficient of leafiness 0.08), narrowly lanceolate, acute (7:1), moderately stellate-hairy above, to stellately tomentose beneath. Inflorescence shallowly dichotomously paniculate, with 5-7 capitula; acladium 20 mm long; peduncles without or with occasional simple hairs and with occasional glands, white-tomentose. Involucres 7.5-8.5 mm long; involucral bracts narrow, acute, pubescence to scattered, 32(24-40), hairs 1.5 mm long, to sparsely, 16(14-18), glandular, glands 0.3-0.4 mm long, densely stellate-hairy. Flowering July.



On sands and along edges of pine forests.—*European Part*: Baltic Region, Ladoga-Ilmen (south). Endemic? Described from vicinity of Pechora (former Pskov Region). Type in Tartu.

Note. It is distinguished from the closely related species *H. rothianum* (Wallr.) Zahn by fewer (2–3) cauline leaves, their relative width (5:1), and the absence of hairs on the peduncles (or hairs occasional).

Cycle 9. Bifurca Juxip.—*Grex H. bifurcum* M.B. ex Zahn in Pflzr. IV, 280, (1923) 1383; Asch. and Graebn. Synopsis, XII, I, 273, sub. *H. eu-bifurcum* Zahn.—*H. echiodides* < *pilosella* Zahn in Pflzr. I. c. p. 1381.—With stolons resembling those of *H. pilosella* and closer to it than *Cinerea*; ligules quite often with red stripes outside; glands on involucre bracts and peduncles occasional to barely scattered.

Note. M. Bieberstein characterized his *H. bifurcum* differently at different times: in *Fl. taur.-cauc.* (II, 251) the plant is included under *Cinerea*, but in Volume III (1819) he mentions the stolons, which means that many related forms have been included under *H. bifurcum* M.B. This later created much confusion. This problem has not been resolved conclusively even to this day. In view of these facts, we are not recognizing *H. eu-bifurcum* (M.B.) Zahn from Crimea, because the descriptions of Zahn, and Naegeli and Peter disagree (regarding stolons); we did not see Bieberstein's authentic plant.

431 487. *H. frickii* Zahn in Izv. Kavk. Muzeya, VII (1912) 132; Pflzr. IV, 280, 1383.

Perennial. Stem 10–20 cm high, with scattered bristles 3 mm long, with sparse glands above, moderately stellate-hairy; stolons slender, with scattered hairs 3–5 mm long. Basal leaves lanceolate-spatulate, obtuse or subacute, with scattered hairs, without stellate hairs above, densely stellate-hairy beneath; cauline leaves 1 (coefficient of leafiness 0.07). Inflorescence shallowly dichotomous, with 3–5 capitula; acladium 10–15 mm long; peduncles moderately hairy, with scattered glands, gray-tomentose. Involucres 8–9 mm long; involucre bracts somewhat broad, with broad, light-colored border, moderately covered with light-colored hairs, with scattered glands, grayish-pubescent. Ligules yellow, without stripes outside. Flowering June to July.

Caucasus: Transcaucasia (without detailed and specific reference). Endemic. Described from Caucasus.

488. *H. longipes* C. Koch ex N.P. Hier. Mitteleur. I (1885) 509; Zahn in Pflzr. IV, 280, 1384, non Freyn and Sint. (1894).

Perennial. Stem 16–30 cm high, 1.5–2.0 mm in diameter, with sparse, bristles 3–4 mm long, light-colored in lower part and rather dark in upper part, sometimes with occasional glands, with scattered stellate hairs; shoots long, slender, stiff (under cultivation branched and with rudimentary inflorescences); basal leaves 4–7, spatulate-lanceolate, subobtusate to acute, glaucescent, with scattered pubescence with bristles 3–6 mm long above, much shorter and softer along margin and beneath, without stellate hairs above, to transparently tomentose beneath (gray-green); cauline leaves (0–)1, (coefficient of leafiness 0.05) in lower part of stem. Inflorescence to deeply dichotomous, with 2–4 capitula; acladium 70–200 mm long; peduncles with scattered hairs and glands, gray-tomentose; floral bracts light-colored. Involucres 7–10 mm long, ovate-subglobose; involucre bracts somewhat narrow, acute, blackish, with distinct light-colored border, with moderate, 43(26–60), dark hairs 2–3 mm long, very sparsely, 12(5–20), glandular with glands 0.3–0.5 mm long, with scattered stellate-hairs thinning upward (margin without hairs). Ligules yellow, without stripes or with colored teeth. Flowering June to July.

Forest edges and scrubs to middle montane zone.—*European Part*: Crimea; *Caucasus*: Ciscaucasia, Dagestan, Western Transcaucasia, Talysh. Endemic. Described from Beshtau Mountain (near Pyatigorsk). Type in Munich.

Note. Apparently, *H. ciniferum* Kozl. and Zahn (*Vestn. Tifl. Bot. Sada*, 29, 3; *Pflzr.* IV, 280, 1384) belongs to this species, as may be concluded from the very incomplete description. The species was described from the vicinity of Bakuriani. However, we were unable to see the authentic specimen.

489. **H. vindobonae** Zahn in *Pflzr.* IV, 280 (1923) 1384; Asch. and Graebn. Synopsis, XII, I, 274.—*H. vindobonense* N.P. Hier. *Mitteleur.* I (1895) 511, non Wiesb. (1884).

- 432 Perennial. Stem 15–18 cm high, slender, with sparse, light-colored hairs 1–2 mm long, with occasional glands above, densely to moderately stellate-hairy; shoots somewhat long, slender. Basal leaves narrowly lanceolate, very acute, glaucous, with sparse bristles 2–3 mm long, bristles softer and shorter beneath, without or with scattered stellate hairs above, whitish beneath from hairs; cauline leaves 0–1 (coefficient of leafiness 0.03). Inflorescence deeply dichotomous, with 2–4 capitula; acladium 55–65 mm long; peduncles with 1–2 mm long, pubescence sparse to scattered, with occasional glands, gray-tomentose; floral bracts light gray. Involucres 7.5–8.0 mm long, ovate; involucre bracts narrow, acute, dark gray, with broad light-colored border, with occasional to scattered light-colored hairs 0.5 mm long, more or less eglandular (or to sparse glands), gray from stellate hairs, but

along margin with sparse hairs. Corollas yellow; ligules red at tip. Flowering June to July.

Dry grassy places.—*European Part*: Upper Dniester (Lvov); *Caucasus*: Southern Transcaucasia (Akhalsikhe). *General distribution*: Central Europe. Described from Vienna. Type in Munich.

Note. We were unable to see the plant collected by G. Radde from Akhalsikhe. Apparently, *H. subvindobonense* Zahn, found by Ruprecht in Dagestan and described by Zahn (*Fedde, Repert*, III, 183; *Pflzr.* IV, 280, 1384), belongs here.

490. **H. sterromastix** N.P. Hier. Mitteleur. I (1885) 510; Zahn in *Pflzr.* IV, 280, 1384; Asch. and Graebn. Synopsis, XII, I, 275.—*H. collinum* Bess. Prim. fl. Galic. II (1809) 148 p. p.—*Exs.*: Callier, Herb. Ross. No. 73.

Perennial. Stem 15–20 cm high, 1.5–2.0 mm in diameter, with sparse to scattered bristles 3–4 mm long, glands scattered to occasional, densely stellate-hairy; stolons long, slender, stiff. Basal leaves lanceolate, acute, glaucescent, with occasional bristles 3–5 mm long above, and sparsely stiff-hairy beneath, without stellate hairs above, but moderately to very densely stellate-hairy (grayish) beneath; cauline leaves 1, (coefficient of leafiness 0.06) in lower part of stem. Inflorescence deeply dichotomous, with 2 capitula; acladium 35–110 mm long; peduncles glabrous and with scattered glands or with scattered hairs and occasional glands, gray-tomentose; floral bracts light-colored; involucre 8.5 mm long, subglobose; involucre bracts somewhat broad, acute, more or less without border, glabrous and with scattered glands or with scattered, dark hairs 1.5 mm long but with occasional glands, gray from stellate hairs. Flowering June to July.

Dry grassy and stony places.—*European Part*: Middle Dnieper, Upper Dniester, Crimea. *General distribution*: Central Europe. Described from Volyna (collected by Besser). Type in Munich.

433 **Note.** It follows from this description that, apparently, two closely related species were united under *H. sterromastix* N.P.

491. **H. szovitsii** N.P. Hier. Mitteleur. I (1885) 510; Zahn in *Pflzr.* IV, 280 (1923) 1385.

Perennial. Stem 16 cm high, slender, ascending, with sparse, light-colored hairs 2–3 mm long, above with moderate, downward (to base) with gradually thinning glands, densely stellate-hairy; stolons short, slender. Basal leaves oblong-lanceolate, acute, dark, glaucescent, on both sides sparsely hairy, above with stiff bristles 5–6 mm long, with softer bristles beneath, without stellate hairs above, grayish beneath from dense hairs; cauline leaves absent. Inflorescence very deeply

dichotomous, with 2 capitula; acladium 120–140 mm long; peduncles with sparse hairs, moderately glandular, gray-tomentose; floral bracts light-colored. Involucres 8.0–8.5 mm long, subglobose; involucre bracts somewhat broad, acute, dark gray with light-colored border, with moderate rather dark hairs 1 mm long, very densely glandular, densely stellate-hairy but margins glabrous. Corollas yellow, with reddish ligule teeth. Flowering June to July.

European Part: Crimea; *Caucasus:* Western Transcaucasia. Described from Imeretia. Type in Munich.

Section 17. *Praealtina* N.P. Hier. Mitteleur. I (1885) 117, 519, 820; Gremli, Exs. Fl. Schweiz, V, 330; Arv.-Touv. Hier. Alp. fl. 14; Zahn in Pflzr. IV, 280, 1391; Asch. and Graebn. Synopsis, XII, I (1922) 7 (1929) 283.—Characters in key to sections (p. 9). Stem thick, more or less glabrous (but can be pubescent in species transitional to other sections), without or with numerous, long, slender stolons, which, however, under stunted conditions can be absent; leaves lanceolate or linear, entire, somewhat stiff, glaucous, with long scattered bristles along margin toward base, in other parts (in typical species) more or less glabrous and without stellate hairs (or with more or less sparse hairs beneath along midrib). Inflorescence pseudo-panicle or (at top) pseudo-umbel (cymose), with many or numerous small capitula (inflorescence also even dichotomous in species transitional to section *Pilosellina*); involucre (typically) with fewer simple hairs, glands, and stellate hairs; corollas yellow; stigmas yellow.

Throughout Europe, excluding almost all of Spain, Great Britain, almost all of Scandinavia and entire Arctic; extends (according to Zahn) to Soviet Central Asia and Siberia (to Ob), becoming much rarer to the east.

KEY TO SUBSECTIONS OF SECTION *PRAEALTINA*

1. Stellate hairs (on stems, leaves, peduncles, and involucre bracts) and pubescence on plant as a whole sparse.....2.
- + Stellate hairs on plant as a whole scattered to dense.....3.
- 434 2. Plants without stolons.....Subsection 1. ***Florentina*** Juxip
- + Plant with long, slender stolons with few small leaves.....
-Subsection 2. ***Bauhinia*** Juxip
3. Stellate pubescence moderate to dense; glands in inflorescence mostly sparse.....4.
- + Stellate pubescence scattered; glands in inflorescence mostly numerous; inflorescence mostly with few capitula.....6.

4. Inflorescence openly umbellate-paniculate, mostly with many capitula, less often shallowly dichotomous.....5.
- + Inflorescence shallow or deeply forked (less often openly paniculate), with fewer capitula; stellate hairs dense on leaves beneath.....Subsection 7. **Praealtopilosellina** Juxip
5. Plant with stiff bristles; leaves yellow- or gray-green; glands in inflorescence sparse...Subsection 3. **Praealtoechinina** Juxip
- + Plant with soft, usually short bristles, leaves glaucescent; glands in inflorescence more or less numerous.....Subsection 4. **Praealtocymosina** Juxip
6. Pubescence as a whole moderate, in habit resembling species of section *Pratensina*; leaves glaucescent.....Subsection 5. **Praealtoprattensina** Juxip
- + Pubescence as a whole sparse, in habit resembling weak plants of species of section *Praealtina*; leaves glaucous.....Subsection 6. **Praealtoauriculina** Juxip

Subsection 1. Florentina Juxip—*H. florentinum* All. Fl. Pedem. I, (1785) 213; N.P. Hier. Mitteleur. I, 526; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1087; Zahn, Hier. fl. Mosquens. 35; Pflzr. IV, 28, 1395; Grossh., Fl. Kavk. IV, 278; Ganeschin in Maevsk. Fl. 7, ed. (1940) 780.—*H. piloselloides* Vill. Prosp. hist. pl. Dauph. (1779) 34; Hist. pl. Dauph. III (1789) 100; Lam. and DC. Fl. IV, 25; Ldb. Fl. Ross. II, 848; Boiss. Fl. or. III, 863; Zahn in Hegi, Ill. Fl. VI, 2, 1229, Asch. and Graebn. Synopsis, XII, I, 287.—*H. praealtum* Vill. apud Gochn. Tent. pl. Cichor. (1808) 17; Vill. Précis voyage bot. 62; Lam. and DC. Fl. Fr. V, 441; Koch Synopsis, 2, II, 513 p. p.; Ldb. Fl. Ross. II, 848; Schmalh. Fl. II, 158; Korsh. Tent. Fl. Ross. Or. 266; Petunn. in Syreistsch. Fl. Mosk. Gub. III, 357.—Rhizome vertical, short, rather thick, regeneration only by sessile rosettes, stolons absent (distinguished from subsection *Bauhinia* mainly by this character). Basal leaves mostly numerous, outer sometimes lobed, obtuse, inner (or all leaves) lanceolate to linear, acute, stiff, glaucous, very sparsely pubescent, stellate hairs mostly absent or quite sparse beneath along midrib. Inflorescence more or less openly paniculate, often umbellate at top, with remote lower
435 branches, mostly with many capitula; involucre 5–7 (–8.5) mm long; corollas yellow; teeth of peripheral ligulate florets often dull green or dark red; florets very rarely tubular; stigmas yellow.

Dry, open grassy places, dry valley meadows, edges of open forests, scrubs, moorlands, and old fields and often in large numbers. Xerophytes and heliophytes. A highly polymorphic subsection (particularly, in center of its range in Central and Southern Europe).

In our country, the members of subsection *Florentina* are distributed more in the western regions of the European Part of the Soviet Union; they become very rare in the east and, apparently, do not cross this line; southern shores of Lake Ladoga-Kalinin—course of Volga up to Gorky-Penza—southwest of Kiev, in the eastern and southeastern directions. The literature reports of the occurrence of species of this subsection farther east or south of this line (excluding Transcaucasia) are partly based on mix-up with subsection *Bauhinia*, and partly on the uniting of the two subsections into one, or treating *Bauhinia* as a part of *Florentina*. Among the earlier authors only S. Korzhinsky (*Tent.* 1. c.) doubted the veracity of the report of this group from the east of the European Part of Russia, which is a credit to his ability for critical observation. The question of the geographical distribution of this subsection in our country remains open, however, because of the completely inadequate studies of this subsection, as well as the quite usual confusing of the species of subsection *Florentina* with nonstoloniferous plants (stunted) of *Bauhinia* and even with *H. floribundum* Wimm. and Grab. In any case, the limits of distribution of this subsection (aggregate species, according to Zahn) drawn by the latter (*Pflzr.* IV, 280, 1392) undoubtedly needs correction with respect to the southeastern part of the Soviet Union.

Where the two subsections come in contact (their ranges partly overlap), hybrids could form with other members of the subgenus *Pilosella*. It is difficult, at times absolutely impossible, to decide what the progenitor species of such hybrids are (particularly in herbarium material without any indication of the associated species). It is necessary to keep in mind, for example, that nonstoloniferous species of *Florentina* when crossed with other stoloniferous species could also give rise to stoloniferous hybrids.

Despite the fact that Fries (*Symbolae*, 25) had already reported that *H. florentinum* All. (= *H. piloselloides* Vill.) is found only south of the alpine chain, his report for some reason was not given due attention. Naegeli and Peter (*Hier. Mitteleur.* I, 559) again drew the attention of botanists to this fact, pointing out that the Central European species somewhat similar to the typical southern *H. florentinum* All. are nevertheless not identical, but in fact (e.g. *H. parcifloccum* N.P.) are vicarious species. By comparison with typical representatives, they have broader leaves, more densely stellate-hairy peduncles and involucre bracts, and larger involucre (for details see: *Pflzr.* IV, 280, 1395; Asch. and Graebn. *Synopsis*, XII, I, 287). Consequently, our plants should be considered as *H. florentinum* auct. non All.

H. florentinum All. is distinguished from our species, apart from geographic distribution, also by its extraordinarily unique habit

(completely glabrous and quite slender peduncles). With a high degree of probability, we can list here the Caucasian specimens of this subsection (*H. stupposipilum* Woron. and Zahn may even be one of the species not discovered there).

In the species of this subsection, one can often observe galls on the inflorescence formed by the biting and piercing of insects.

1. Peduncles densely stellate-hairy or tomentose.....2.
- + Peduncles more or less without stellate hairs or with sparse hairs below capitula, but lower down more or less glabrous, slender; stem at base densely hairy; coefficient of leafiness high (0.10). Plants of Caucasus.....504. **H. stupposipilum** Woron. and Zahn
2. Floral bracts dark, without distinct border.....3.
- + Floral bracts light-colored or with broad light-colored border or gray.....8.
3. Peduncles more or less sparsely (occasionally) glandular.....4.
- + Peduncles with scattered to dense glands.....6.
4. Involucral bracts with sparse simple hairs and scattered stellate hairs.....494. **H. aquilonare** (N.P.) Zahn
- + Involucral bracts glabrous.....5.
5. Involucral bracts (and leaves beneath) without stellate hairs.....495. **H. maurocybe** Juxip
- + Involucral bracts and leaves with scattered stellate pubescence beneath; stem densely floccose (farinaceous).....492. **H. floccipedunculum** N.P.
6. Involucral bracts with (sparse) intensely black simple hairs and sparse stellate hairs; corollas often tubular.....496. **H. melanocybe** Norrl.
- + Involucral bracts glabrous (or with occasional hairs).....7.
7. Outer basal leaves lobed, rounded-obtuse; inflorescence densely paniculate, with 4–10 capitula; involucral bracts (and peduncles) glabrous.....497. **H. ericetorum** N.P.
- + All leaves lanceolate, acute; inflorescence openly paniculate, with 10–40 capitula; involucral bracts (and peduncles) glabrous or with occasional hairs (var. *pilosiceps* N.P.).....498. **H. obscurum** Rchb.
- 8 (2). Peduncles more or less sparsely (occasionally) glandular.....9.
- + Peduncles with scattered to dense glands.....12.
9. Floral bracts dark, with conspicuous light-colored border.....10.
- + Floral bracts gray or light-colored.....11.
- 437 10. Leaves without stellate hairs beneath; corollas golden yellow; all leaves lanceolate, acute.....499. **H. praealtum** (Vill.) N.P.

- + Leaves more or less stellate-hairy beneath (at least along midrib); corollas light yellow; outer basal leaves lobed or ligulate, obtuse.....500. **H. stellatum** Tausch
- 11. Involucral bracts hairy; leaves without stellate hairs beneath; inflorescence paniculate.....501. **H. tenebricans** Norrl.
- + Involucral bracts glabrous; leaves sparsely stellate-hairy beneath; inflorescence paniculate-umbellate.....493. **H. subcymigerum** N.P.
- 12 (8). Floral bracts dark, with broad white border; involucral bracts with scattered and peduncles with up to dense glands.....502. **H. lycense** N.P.
- + Floral bracts light-colored, with white border; involucral bracts with occasional glands; peduncles with up to scattered glands.....503. **H. septentrionale** Norrl.

Cycle 1. Subcymigera Juxip.—Grex *H. subcymigerum* Zahn in Pflzr. IV, 280 (1923) 1405; Asch. and Graebn. Synopsis, XII, I, 301; greges *Poliocladum* and *Radiatum* N.P. Hier. Mitteleur. I (1885) 543, 547.—Inflorescence paniculate but umbellate at top; peduncles gray-tomentose, mostly sparsely glandular; species similar to *H. zizianum* or *H. fallax* because of more or less umbellate inflorescence.

492. **H. floccipedunculum** N.P. Hier. Mitteleur. I (1885) 544; Zahn in Pflzr. IV, 280, 1407; Asch. and Graebn. Synopsis, XII, I, 306.—Exs.: GRF No. 1273 (sub *H. canipedunculum* N.P. sed postea ad *H. floccipeduncululum* N.P. transcribit.); Zahn, Hier. Europ. No. 840.

Perennial. Stem 20–60 cm high, slender, only in upper part with occasional dark hairs 1–2 mm long, eglandular, very densely stellate-hairy, hence stem appears farinaceous. Outer basal leaves somewhat lobed, obtuse, inner lanceolate to linear, acute, glaucous, with occasional bristles 1.5–3.0 mm long, only along margin toward base and beneath along midrib, with more or less scattered stellate hairs beneath; cauline leaves 2 (coefficient of leafiness 0.05), linear, acute. Inflorescence openly paniculate, with 10–20 capitula; peduncles slender, without simple hairs, eglandular or with occasional glands below capitula, gray from stellate hairs, thinning downward; floral bracts dark. Involucres 6.5–7.0 mm long, cylindrical; involucral bracts narrow, acute, blackish, scarcely light-bordered, glabrous (or with 1–2 hairs 1.5 mm long), with numerous fine glands, to moderately stellate-hairy. Corollas yellow. Stigmas yellow. Flowering June to July.

438 Dry meadows.—*European Part*: Baltic Region, Upper Volga, Middle Dnieper, *General distribution*: Central Europe. Described from Bavaria. Type in Munich.

493. **H. subcymigerum** N.P. Hier. Mitteleur. I (1885) 546; Zahn in Pflzr. IV, 280, 1405; Asch. and Graebn. Synopsis, XII, I, 302.—Exs.: Hier. Naeg. No. 36; Petrak, No. 587; Callier. Fl. Siles. exs. No. 1242.

Perennial. Stem 40–75 cm high, 2 mm in diameter, at base with occasional, light-colored bristles, 1.5–2.5 mm long, above with occasional glands and quite sparsely stellate-hairy; often with collateral stems or runners. Basal leaves 3–8, outer lanceolate, obtuse, inner to linear-lanceolate (12:1), subacute, sometimes with remote fine (spinescent) teeth, glaucous, with sparse bristles 2.0–3.5 mm long along margin and midrib beneath, often very sparsely stellate-hairy beneath (or not); cauline leaves 2–4 (coefficient of leafiness 0.05), lanceolate, acute, narrow (11:1), weakly stellate-hairy beneath. Inflorescence openly paniculate to umbellate, with 5–30 capitula; peduncles without simple hairs, with occasional glands, gray from stellate hairs; floral bracts gray. Involucres 6.5–7.0 mm long, cylindrical; involucre bracts somewhat broad, subacute, dark with broad light-green border, without simple hairs, with occasional, 10(6–12), glands 0.4–0.5 mm long, stellate pubescence scattered but dense at base. Corollas yellow. Stigmas yellow. Flowering June to July.

Dry grassy places.—*European Part*: Baltic Region, Ladoga-Ilmen. *General distribution*: Central Europe. Described from Austria. Type in Munich.

Note. *H. hyperboreiforme* N.P. (Hier. Mitteleur. I, 663; Pflzr. IV, 280, 1500), described from St. Petersburg (probably from the Botanical Garden), apparently is close to this species.

Cycle 2. Obscura Juxip.—*Grex H. obscurum* N.P. Hier. Mitteleur. I (1885) 529; Zahn in Pflzr. IV, 280, 1396; Hegi, Ill. Fl. VI, 2, 1230; Asch. and Graebn. Synopsis, XII, I, 289.—Inflorescence mostly open or very openly paniculate, mostly with very numerous capitula; involucre bracts somewhat dark, scarcely with border; peduncles gray-tomentose, conspicuously (to scattered) glandular with black glands; stem at tip with occasional to scattered glands.

494. **H. aquilonare** (N.P.) Zahn in Pflzr. IV, 280 (1923) 1400; Asch. and Graebn. Synopsis, XII, I, 294.—*H. subfrigidarium* β . *aquilonare* N.P. Hier. Mitteleur. I (1885) 532; Zahn, Hier. fl. Mosquens. 36.

Perennial. Stem 35–40 cm high, slender, at base with sparse, light-colored bristles 2–4 mm long, thinning upward, isolated, 1–2 mm long, 439 dark, with occasional glands above and sparsely stellate-hairy. Outer basal leaves short, lobed, rounded-obtuse, inner narrowly lanceolate, acute, moderately setose above and along midrib beneath with bristles 3–6 mm long, with occasional bristles beneath, almost without stellate

hairs or with sparse hairs along midrib; cauline leaves 2 (coefficient of leafiness 0.05), lanceolate, acute, with occasional hairs (along midrib beneath). Inflorescence openly paniculate, with 8–10 capitula; peduncles slender, without or with occasional simple hairs sparsely glandular, gray-tomentose; floral bracts dark. Involucres 6–7 mm long, cylindrical; involucre bracts narrow, subacute, blackish, with scarcely distinct border, with sparse dark hairs 1.0–2.5 mm long, quite conspicuously glandular, with scattered stellate hairs, dense at base. Corollas light-yellow. Stigmas yellow. Flowering June to July.

Dry meadows and along forest edges.—*European Part*: Baltic Region; Lodoga-Ilmen, Upper Volga, Upper Dniester. *General distribution*: Central Europe. Described from vicinity of Leningrad. Type in Munich.

495. **H. maurocybe** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 527.

Perennial. Stem 35–70 cm high, 2–3 mm in diameter, glabrous or with scattered pubescence, with occasional glands above. Basal leaves 2–10, lanceolate, subobtusate to linear-lanceolate and acute, to 12 cm long (12:1), more or less glabrous (with occasional hairs along margin at base and along midrib beneath); cauline leaves 3(1–6) (coefficient of leafiness 0.06), linear, acute. Inflorescence openly paniculate, with 6–30 capitula; peduncles without simple hairs, with occasional glands, more or less gray-tomentose; floral bracts dark. Involucres 6–7 mm long, cylindrical; involucre bracts lanceolate, somewhat narrow, obtuse, black, glabrous (or with 1–2 hairs on some bracts), with sparse, 12(5–20), well-developed glands 0.4–1.0 mm long, almost without stellate hairs. Stigmas yellow. Flowering June to July.

Edges of open forests, glades.—*European Part*: Baltic Region. Endemic? Described from Saaremaa (Oesel) Island. Type in Riga.

Note. It is distinguished from *H. obscurum* Rchb. by peduncles with only occasional glands and from *H. melanocybe* Norrl. by the absence of hairs on the involucre bracts.

496. **H. melanocybe** Norrl. in Acta Soc. Fa. et Fl. Fenn. XII, No. 4 (1895) 54, sub *Pilosella melanophaea*; in Mela-Cajander, Suom. Kasvio, 654; Zahn in Pflzr. IV, 280, 1400.—*Exs.*: Norrl. Herb. Pil. Fenn. II, No. 182; Hier. exs. fasc. IV, No. 30.

Perennial. Stem 25–80 cm high, somewhat thick, 2–3 mm in diameter, violet at base, with bristles occasional to sparse above, 1.5–3.0 mm long, sparsely glandular; often with collateral stems. Basal leaves 440 6(3–11), lanceolate or ligulate, acute (12:1), with occasional hairs only along margin and midrib beneath; cauline leaves 2–4(1–5) (coefficient

of leafiness 0.06), lanceolate, acute (10:1), with quite sparse stellate hairs along midrib beneath. Inflorescence paniculate, with 5–30 capitula; peduncles with occasional hairs or glabrous, with sparse or scattered glands grayish-tomentose. Involucres (6–)7–8 mm long, cylindrical; involucre bracts broad, somewhat acute, black, with occasional (3–8), intensely black hairs 2–5 mm long (thus, involucres appear as if covered with soot); with sparse (10–25) glands 0.4 mm long, with very sparse stellate hairs at base. Florets often tubular; corolla teeth usually dull green or reddish; stigmas yellow. Flowering June to July.

Meadows and forest edges, old fields.—*European Part*: Baltic Region, Ladoga-Ilmen. *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki; paratype in Leningrad.

Note. Among the plants with intensely black involucre bracts, we also find some with the bracts less distinctly black (dark green); the most brightly colored specimens were from seashores.

Apparently, *H. gotlandicum* (Fr.) N.P., p. p., whose var. *β. pilosiceps* N.P. (*Hier. Mitteleur.* I, 536) was found in the vicinity of Leningrad, is close to this species. It is distinguished from *H. melanocybe* Norrl. by somewhat more dense hairs on all parts of the plant. As we have not seen the authentic specimen, we will not risk treating it as a synonym of *H. melanocybe* Norrl.

497. ***H. ericetorum*** N.P. *Hier. Mitteleur.* I (1885) 533; nec Freyn (1887); Zahn in *Pflzr.* IV, 280, 1398; Asch. and Graebn. *Synopsis*, XII, I, 292.—**Exs.**: GRF No. 1274.

Perennial. Stem 30–70 cm high, 1.5–3.0 mm in diameter, with occasional white hairs 1.0–1.5 mm long above, thinning downward, with sparse glands above, without stellate hairs. Basal leaves 7(2–12), to 20 cm long (10–20:1), outer lobed, rounded-obtuse, inner lanceolate and acute, glaucous, with occasional white bristles 1.5–3.0 mm long only along margin and veins beneath, without stellate hairs; cauline leaves 3(2–6) (coefficient of leafiness 0.06), lanceolate, acute. Inflorescence somewhat densely paniculate, with 4–34(–57) capitula; peduncles without simple hairs, moderately glandular, gray-tomentose; floral bracts dark. Involucres (5.0)6.5–7.5 mm long, cylindrical; involucre bracts narrow, acute, blackish, scarcely with light-colored border, without simple hairs, with sparse to scattered, 24(10–34), glands 0.3–0.5 mm long, with scattered stellate hairs. Stigmas yellow. Flowering June to July.

Sands and in moors.—*European Part*: Baltic Region, Ladoga-Ilmen. *General distribution*: Central Europe. Described from Bavaria. Type in Munich.

Note. *H. spathophylloids* Zahn (*Hier. Fl. Mosquens.* 36; Engl. *Pflzr.* IV, 280, 1398) is close to this species, which is distinguished by

- 441 having somewhat broad, subacute involucre bracts with a broad green border and involucre to 6 mm long. Described from the Moscow Region (found by A. Petunnikov).

498. **H. obscurum** Rchb. Fl. Germ. excurs. (1830) 263; non al.; N.P. Hier. Mitteleur. I, 530; Zahn, Hier. fl. Mosquens. 36; Zahn in Pflzr. IV, 280, 1397; Asch. and Graebn. Synopsis, XII, I, 289, and *H. eu-obscurum* Zahn.—*H. praealtum* var. *obscurum* (and *hispidulum*) Froel. in DC. Prodr. VII (1838) 205.—**Ic.**: Syreitsch. Fl. Mosk. Gub. III, 358.—**Exs.**: Hier. Naeg. No. 35; Fl. Bav. exs. Nos. 545, 548; Zahn, Hier. Europ. Nos. 121, 427; Hayek, Fl. Stir. exs. Nos. 399, 400.

Perennial. Stem 30–70 cm high, thinish, at base with quite sparse hairs 2–3 mm long, above glabrous or slightly hairy (subvar. *pilosiceps* N.P.) and very sparsely glandular, without stellate hairs, often stems several. Basal leaves 7(5–10), lanceolate and subacute to narrowly lanceolate and acute, to 13 cm long (10–11:1), glaucous, with sparse bristles 4–6 mm long only along margin and midrib beneath, without stellate hairs (or with occasional hairs beneath along midrib); cauline leaves 2–4 (coefficient of leafiness 0.06), mostly small, lanceolate, acute, eglandular. Inflorescence openly paniculate, with 10–40 capitula, with 1–2 remote lower branches; peduncles slender, without (or with occasional) simple hairs, moderately glandular, gray-tomentose; floral bracts dark. Involucres 6–7 mm long, cylindrical; involucre bracts narrow, acute, black, scarcely bordered, without or with occasional simple hairs (subvar. *pilosiceps* N.P.), quite conspicuously, 30(25–35), glandular with glands 0.5 mm long, moderately stellate-hairy. Stigmas yellow. Flowering June to July.

Dry meadows, forest edges and old fields.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Volga, Upper Dniester. *General distribution*: Central Europe, Mediterranean. Described from Bavaria. Type in Munich.

Cycle 3. Praealta Juxip.—Grex *H. praealtum* N.P. Hier. Mitteleur. I (1885) 527, 536; Zahn in Pflzr. IV, 280, 1400; Hegi, Ill. Fl. VI, 2, 1230; Asch. and Graebn. Synopsis, XII, I, 294.—*H. praealtum* Vill. ex Gochn. Tent. pl. Cichor. (1808) 17; Gren. and Godr. Fl. Fr. II, 350; Fr. Epicr. 30.—Involucre bracts with narrow or broad light-colored border; floral bracts whitish or with broad whitish border; glands mostly numerous.

499. **H. praealtum** (Vill.) N.P. Hier. Mitteleur. I (1885) 539; Zahn in Pflzr. IV, 280, 1402; Asch. and Graebn. Synopsis, XII, I, 296, sub *H. eu-praealtum* Zahn.—*H. praealtum* Vill. ex Gochn. Tent. pl. Cichor. (1808) 17.—*H. fallax* Lam. and DC. Fl. Fr. V (1815) 442.—*H. cymosum* Schult. Oester. Fl. II (1815) 432.—*H. paliocladum* β . *praealtiforme* 2 *hirsutum*

- N.P. Hier. Mitteleur. I (1885) 545; Dahlst. Beitr. Hier.-Fl. Oesels (1901) 442 23.—**lc.**: Vill. Précis voyage bot. (1812) 62, t. 2, fig. 1.—**Exs.**: Hier. Naeg. No. 263; Zahn, Hier. Europ. No. 529; Baenitz, Herb. Europ. No. 2170; GRF No. 2226.

Perennial. Stem 50–70 cm high, 2–3 mm in diameter, in lower part with occasional, light-colored hairs 1.0–2.5 mm long, above with sparse, black hairs and occasional glands, without stellate hairs. Basal leaves 3–10, lanceolate to linear-lanceolate (11–12:1), acute, glaucous, with occasional bristles along margin toward base and occasional to sparse bristles 1–3 mm long along midrib beneath, without stellate hairs (or occasional flocculent hairs beneath, along midrib); cauline leaves 2–3 (coefficient of leafiness 0.04), linear-lanceolate, acute. Inflorescence densely paniculate, later more open or umbellate at tip (var. *praealtiforme* Zahn = ssp. *poliocladium* β . *praealtiforme* 2. *hirsutum* N.P. l. c.), with 10–30 capitula; peduncles somewhat thick, glabrous (or with occasional simple hairs), with occasional glands, gray-tomentose, with stellate hairs abruptly thinning downward; floral bracts dark with light-colored border. Involucres 6–7 mm long, cylindrical; involucral bracts somewhat broad, acute, blackish, with distinct, mostly broad, light-colored border, with very sparse, black hairs 1–2 mm long or hairs to scattered (var. *praealtiforme* Zahn = ssp. *Poliocladium* β . *praealtiforme* 2. *hirsutum* N.P. l. c.), with glands few to scattered, 0.3 mm long, or sparse (var. *majusculum* N.P.), with scattered stellate hairs. Corollas golden yellow. Stigmas yellow. Flowering June to July. (Plate XXXVI, Fig. 1.)

Dry meadows with sparse forest, forest edges, open forests, sunny slopes, borders of fields.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Dnieper, Upper Dniester. *General distribution*: Central Europe (up to Northern and Baltic seas), Mediterranean. Described from Rhine Province. Type unknown.

Note. A highly polymorphic species distinguished by different pubescence; var. *praealtiforme* Zahn is found particularly in the northern part of the range of this species, i.e., it is mostly found in our country.

H. sanii N.P. (*Hier. Mitteleur.* I, 540; Zahn in *Pflzr.* IV, 280, 1402; Asch. and Graebn. *Synopsis*, XII, I, 297) is close to this species. *H. sanii* is distinguished by having 3–5 cauline leaves, more conspicuous hairs on the stem, narrow and subobtusely involucral bracts, with a larger number (20–25) of glands, and dark yellow florets. Found in the Baltic Region (from Vistula to Neman).

H. siphonanthum Juz. and Bystr. (*Izv. Glavn. Bot. Sada*, XXVI, 1927, 183) also approaches this species, which is distinguished from, *H. praealtum* by the tubular florets. Described from the Leningrad Region. Type in Leningrad.

500. **H. stellatum** Tausch in Flora, XI (1828) Erg.-Bl. I, 59; N.P. Hier. Mitteleur. I, 543; Zahn in Pflzr. IV, 280, 1401; Asch. and Graebn. Synopsis, XII, I, 295.—*H. albidobracteum* 2. *pilosiceps* N.P. l. c.;
 443 Dahlst; Bidr. Sydöstr. Sverig. Hier.-Fl. I (1890) 110.—**Exs.:** Dahlst. Hier. Scand. exs. VIII, No. 45.

Perennial. Stem 20–80 cm high, 1.5–2.5 mm in diameter, with occasional simple hairs at base, glabrous above, with occasional to scattered glands in upper part, without stellate hairs. Basal leaves spatulate-linear, obtuse to ligulate and linear-lanceolate and acuminate (12:1), glaucous, almost glabrous, with occasional bristles 2–3(–10) mm long along margin and midrib beneath, without stellate hairs; cauline leaves 2–3 (coefficient of leafiness 0.05), linear, acute, without simple hairs, with scattered stellate hairs along midrib beneath (var. *stellatum* Zahn) or almost without stellate hairs (var. *septentrionale* Zahn). Inflorescence openly paniculate, with 5–35 capitula; peduncles glabrous or with occasional bristles, eglandular or with occasional glands, gray-tomentose; floral bracts dark, with broad, white border. Involucres (6–)7(–8) long, cylindrical; involucre bracts somewhat broad, sub-acute, dark, with broad, white borders, glabrous or with occasional, black hairs 1 mm long, sparse (–15) glands 0.4–0.5 mm long, sparsely stellate-hairy. Corollas light yellow, corolla teeth often dull green. Stigmas yellow. Flowering June to July.

Dry meadows and forest edges.—*European Part:* Baltic Region, Ladoga-Ilmen. *General distribution:* Scandinavia, Central Europe. Described from Germany. Type unknown.

501. **H. tenebricans** Norrl. Anteckn. öfver Finl. Pilosellae, I (1884) 148; sub *Pilosella septentrionalis* var. *tenebricans* Norrl.; in Mela-Cajander, Suom. Kasvio, 654; Zahn in Pflzr. IV, 280, 1401.—*H. poliocladum* var. *tenebricans* N.P. Hier. Mitteleur. I (1885) 545; Dahlst. Beitr. Hier.-Fl. Oesels, 23.—**Exs.:** Norrl. Herb. Pil. Fenn. I, No. 80; Hier. exs. II, Nos. 69, 70; Lindberg, Pl. Finls. exs. Nos. 1616, 1617.

Perennial. Stem 40–80 cm high, 2–3 mm in diameter, violet at base, with occasional to sparse hairs 2 mm long, with occasional glands above. Basal leaves 6(3–12), outer lobed, inner narrowly lanceolate, to 22 cm long (12:1) (9–12:1), acuminate, glaucous, with occasional, bristles 1.5–3 mm long along margin and midrib beneath; cauline leaves 3 (coefficient of leafiness 0.05), narrowly lanceolate, acute. Inflorescence paniculate, with 7–27 capitula; peduncles glabrous, with occasional to sparse glands, more or less tomentose; floral bracts gray or pale. Involucres 6.0–7.5 mm long, cylindrical; involucre bracts somewhat broad, dark, obtuse or acute, with narrow border, with occasional (–5) hairs 1.5 mm long and sparse, 14(10–20), glands 0.4–0.5 mm long,

somewhat stellate-hairy. Corolla teeth often dull green. Stigmas yellow. Flowering June to July.

Dry meadows, edges of open forests.—*European Part*: Baltic Region, Ladoga-Ilmen. *General distribution*: Scandinavia, Central Europe. Described from Finland. Type in Helsinki.

444 **Note.** The typical form is devoid of hairs on the involucre bracts, but in our specimens hairs (at least occasional, 2–5) are always present; according to Dahlstedt, this is *f. hirsutum* N.P. (l. c.).

502. **H. lyccense** N.P. Hier. Mitteleur. I (1885) 538; Dahlst. Hier.-Fl. Oesels (1901) 23; Zahn in Pflzr. IV, 280, 1403; Asch. and Graebn. Synopsis, XII, I, 299.

Stem 45–80 cm high, 2.0–2.5 mm in diameter, with quite sparse, light-colored bristles 2–3 mm long in lower part, with occasional black bristles and scattered glands above. Basal leaves 3–13, oblanceolate, subobtusate to narrowly lanceolate (12:1) and acute, glaucous, with occasional bristles 1–2 mm long only along margin toward base and midrib beneath; cauline leaves 2–3 (coefficient of leafiness 0.04), lanceolate, acute, (10:1). Inflorescence a very open panicle, with 5–35 capitula; peduncles thick, with or without occasional simple hairs, from scattered to quite dense glands, grayish from stellate hairs abruptly thinning downward. Involucres 6.0–7.5 mm long, cylindrical; involucre bracts more or less broad, subobtusate, black, with broad white border, with occasional, 8(6–13), light-colored hairs 1.5–3.0 mm long, from sparse to scattered, 20(15–30), glands 0.4–0.5 mm long, almost without stellate hairs. Corollas dark yellow. Stigmas yellow. Flowering June to July.

Forest edges and meadows of open forests.—*European Part*: Baltic Region, Ladoga-Ilmen. *General distribution*: Central Europe. Described from East Prussia (Lyck). Type in Munich.

503. **H. septentrionale** Norrl. Anteckn. öfver. Finl. Pilosellae, I (1884) 147; in Mela-Cajander, Suom. Kasvio, 653; Samuelsson, Maps of Scand. Hier. sp. No. 11; nec. al.—*H. praealtum* Vill. var. *septentrionale* N.P. Hier. Mitteleur. I (1885) 540; Dahlst. Beitr. Hier. Fl.-Oesels (1901) 22.—*H. almqvistii* N.P. Hier. Mitteleur. I (1885) 537; Zahn in Pflzr. IV, 280, 1403.—**Exs.**: Norrl. Herb. Pil. Fenn. II, Nos. 180, 181; Hier. exs. fasc. II, No. 67, V, Nos. 28, 29; Lindberg, Pl. Finn. exs. No. 1615; Dahlst. Hier. Scand. VIII, Nos. 46, 47, XXIII, No. 12.

Perennial. Stem 20–85 cm high, 1.5–3.5 mm in diameter, often with collateral stems, with occasional, light-colored hairs 2–4 mm long in lower part, sparsely glandular and sparsely stellate-hairy above. Basal leaves 2–13, outer oblanceolate, subobtusate, inner lanceolate to

linear-lanceolate, subacute (10–12:1), glaucous, with occasional bristles 1.5–2.0 mm long along margin and beneath along midrib; cauline leaves 3(1–6) (coefficient of leafiness 0.06), lanceolate, acute, glabrous, sometimes with occasional glands. Inflorescence paniculate, with 16(5–48) capitula, lower branches remote; peduncles without or with occasional simple hairs, with scattered glands 0.4–0.5 mm long, gray-tomentose; floral bracts light-colored, with white border. Involucres 6–7 mm long, 445 cylindrical; involucre bracts mostly narrow, obtuse, with narrow or somewhat broad white border, with occasional, 7(4–14), light-colored hairs 1.5–3.0 mm long and occasional, 8(2–20), glands 0.4–0.6 mm long, conspicuously stellate-hairy. Ligules short, teeth often dull green; corollas often tubular. Stigmas yellow. Regeneration by sessile or petiolate rosettes. Flowering June to July.

Forests meadows, edges of open forest slopes of moraines, clearings and logged areas in forests, roadsides.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Volga. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. Following Zahn, we consider *H. almqvistii* N.P. as a synonym of *H. septentrionale* Norrl.; however, it differs from the latter by having acute involucre bracts.

Cycle 4. Florentina Juxip.—*Grex H. florentinum* Zahn in Pflzr. IV, 280 (1923) 1396, 1409; Hegi, Ill. Fl. 1231; Asch. and Graebn. Synopsis, XII, I, 308; *greges Efloccosum, Cuneense, Lancifolium* and *Florentinum* N.P. Hier. Mitteleur. I (1885) 548, 551, 553, 554.—Peduncles very slender, without stellate hairs or very sparsely pubescent (as also almost all parts of plant); inflorescence quite open; capitula dark. Southern European alpine (Mediterranean) species.

Zahn (Pflzr. IV, 280, 1411) reports *H. cylindriceps* N.P. (Hier. Mitteleur. I, 554) for the former Moscow Province. It is related to the above-mentioned cycle and is distributed in the Mediterranean and Balkans-Asia Minor Region; the distribution of this species in Central Russia is most doubtful.

504. **H. stupposipilum** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 22; Zahn in Pflzr. IV, 280, 1414.

Perennial. Stem 50 cm high, densely setose at base with erect bristles 3–10 mm long, eglandular. Basal leaves oblong-lanceolate, some subobtusate to lanceolate and acute, with bristles 3–10 mm long along margin and beneath along midrib; cauline leaves to 5 (coefficient of leafiness 0.10), lanceolate, like basal leaves. Inflorescence openly paniculate, with 10–25 capitula, peduncles glabrous(?), with very sparse glands, stellate hairs only below capitula, dense, abruptly thinning.

Involucres 6.0–7.5 mm long; involural bracts somewhat broad, subobtusate, dark green, with green border, with sparse hairs and sparse to scattered glands, very sparsely stellate-hairy along midrib beneath, margins glabrous, green. Flowering June to July.

Mountains.—*Caucasus*: Southern Transcaucasia(?). Described from former Artvin District. Type unknown.

Subsection 2. Bauhinia Juxip.—*H. bauhinii* Bess. Prim. Fl. Galic. II (1809) 149; Ldb. Fl. Ross. II, 849; Boiss. Fl. or. III, 862; suppl. 326; 446 Schmalh. Fl. II, 158; Fedtsch. and Fler. Fl. Evrop. Ross. 1088; Zahn in Pflzr. IV, 280, 1415; Hegi, Ill. Fl. VI, 2, 1238; Asch. and Graebn. Synopsis, XII, I, 317; Grossh. Fl. Kavk. IV, 278; Maevsk. Fl. VII, ed. 780.—*H. glaucescens* Bess. Prim. Fl. Galic. II (1809) 159; DC. Prodr. VII, 202.—*H. praealtum* γ. *bauhini* Koch, Synopsis, ed. 2, II (1844) 513.—*H. magyaricum* N.P. Hier. Mitteleur. I (1885) 566, 822.—Rhizome vertical or oblique, short, thickish; regeneration by many (to 10) long (to 40–60 cm), underground, slender, stiff stolons. Leaves small, remote, gradually reduced toward stolon tip, pubescence of stolons often more distinct than on other parts; basal leaves numerous, spatulate and obtuse to lanceolate or linear-lanceolate and acute, stiff, glaucous, with very sparse hairs along margin and along midrib beneath, without or with sparse stellate hairs along midrib. Inflorescence paniculate or somewhat umbellate at top. Involucres 5.0–7.5 mm long. Corollas yellow, quite often with red stripes outside or with dull green teeth. Stigmas yellow.

Dry slopes, scrubs, meadows, grassy and stony places, steppes, sands with rare vegetation patches, edges of pine forests and moors, often in large numbers. Quite a polymorphic subsection, replacing *Florentina* in the eastern half of the European Part of the Soviet Union.

Under unfavorable conditions, plants do not develop stolons, which, however, invariably appear under good conditions; as a result, these species can easily be confused with members of subsection *Florentina*. Therefore, in collections of plants, it is necessary to pay attention to the offshoots, as among well-developed, intact plants we always find also depauperate, suppressed plants; xerophytes and heliophytes. Under shady conditions, the majority of the capitula remain more or less undeveloped, and the involucres of even well-developed capitula are quite short (4.5–5.0 mm long).

While dividing subsection *Bauhinia* (according to Zahn—aggregate species *H. bauhinii* Bess.) into cycles (grexes—according to Zahn), Zahn singled out the group *H. rubro-bauhinii* Zahn, characterizing it as having ligulate peripheral florets that are reddish on the



outside, noting that they grow in Transcaucasia (*Pflzr.* IV, 280, 1415, 1432); he placed all other groups under the heading corolla without purple stripes. Unfortunately, this conclusion is groundless: among the species growing in the European territory of Soviet Union, we often observe peripheral florets that are variously colored on the outside—from brownish-red or dull green ligule teeth to purple-striped ligules.

Naegeli and Peter (*Hier. Mitteleur.* I, 568), and after them Zahn also (*Pflzr.* IV, 280, 1415), established *H. cryptomastix* N.P. as a special group, which is distinguished by having very short, small-leaved stolons and is considered an intermediate form between subsections *Florentina* and *Bauhinia*. Within our flora, Zahn referred the following species to this group: *H. parvistolonum* N.P. (*Hier. Mitteleur.* I, 569; *Pflzr.* IV, 280, 1416), *H. botrychodes* Zahn in *Pflzr.* I. c., *H. empodistum* N.P. *Hier. Mitteleur.* I. c., Zahn in *Pflzr.* I. c. These species are found mainly in Galicia but are reported from the Baltic and Ladoga-Ilmen regions also. However, the very few specimens of these species seen by us apparently were species from subsection *Bauhinia* grown under extremely poor conditions. Therefore, for the time being, we are refraining from including them among the species of our flora.

1. Stolons arising only from basal rosette.....2.
- + Stolons arising not only from basal rosette, but also from axils of lower cauline leaves.....505. **H. rojowskii** Rehm.
2. Peduncles densely stellate-hairy or tomentose.....3.
- + Peduncles almost without or with sparse stellate hairs.....17.
3. Involucres comparatively large, 6.0–7.5(–8.0) mm long.....4.
- + Involucres small, 5–6 mm long.....11.
4. Glands on involucre bracts (and peduncles) moderate to sparse; acladium short (8–10 mm long).....5.
- + Glands on involucre bracts sparse to occasional.....8.
5. Involucre bracts and peduncles glabrous; floral bracts dark with distinct border.....506. **H. obscuribracteum** N.P.
- + Involucre bracts with occasional to moderate hairs.....6.
6. Involucre bracts acute and moderately hairy; peduncles glabrous; floral bracts dark with distinct border; cauline leaves 4; stolons slender.....507. **H. fastigiatum** N.P.
- + Involucre bracts with occasional hairs.....7.
7. Peduncles glabrous; floral bracts dark; cauline leaves 4; stolons slender; involucre bracts acute....507. **H. fastigiatum** N.P.
- + Peduncles with occasional (sometimes to sparse) hairs; floral bracts light-colored; cauline leaves 2; stolons somewhat thick; involucre bracts subobtusate.....508. **H. plicatulum** Zahn
- 8 (4). Peduncles with sparse to occasional glands.....9.

- + Peduncles eglandular; leaves stellate-hairy beneath; floral bracts gray.....10.
- 9. Involucral bracts (and peduncles) glabrous; floral bracts gray.....509. **H. ingricum** N.P.
- 450 + Involucral bracts (and peduncles) hairy (sparse to moderate); floral bracts whitish; hairs on plant dark with black base.....510. **H. melachaetum** Tausch
- 10. Involucral bracts with sparse stellate hairs, without or with occasional simple hairs.....511. **H. thaumasioides** N.P.
- + Involucral bracts densely stellate-hairy, with scattered simple hairs.....512. **H. cymanthum** N.P.
- 11 (3). Involucral bracts with up to scattered glands, without simple hairs, cauline leaves 2–5. Plants of Caucasus.....513. **H. cymanthodes** Kozl. and Zahn
- + Involucral bracts with sparse to occasional glands.....12.
- 12. Peduncles moderate to scattered glands.....13.
- + Peduncles with sparsely glandular to eglandular.....15.
- 13. Floral bracts dark; leaves stellate-hairy beneath (sometimes on both sides); involucral bracts distinctly stellate-hairy.....14.
- + Floral bracts light-colored; leaves with sparse stellate hairs beneath (f. *floccifolium* N.P.) or without such hairs (f. *nudifolium* N.P.); involucral bracts almost without stellate hairs.....516. **H. arborum** N.P.
- 14. Peduncles glabrous.....514. **H. thaumasium** N.P.
- + Peduncles hairy.....515. **H. stauroplitanum** Juxip
- 15. Peduncles with occasional glands; involucral bracts acute; ligules yellow (without red stripes outside).....16.
- + Peduncles completely eglandular; involucral bracts subobtus; ligules with red stripes outside. Plants of Caucasus.....519. **H. rubro-bauhini** Schelk. and Zahn
- 16. Involucral bracts and peduncles with occasional to sparse hairs; leaves without stellate hairs (or weakly hairy beneath along midrib); floral bracts dark.....517. **H. insolens** Norrl.
- + Involucral bracts and peduncles with scattered to moderate hairs (conspicuously hairy); leaves stellate-hairy beneath; floral bracts gray.....518. **H. hispidissium** Rehm.
- 17 (2). Involucre comparatively large, 6.5–8.0 mm long.....18.
- + Involucre medium-sized or small, 5.0–6.5 mm long.....21.
- 18. Involucral bracts (and peduncles) to moderately glandular; floral bracts green (var. *bohemicum* N.P.) or dark brown (var. *sudeticum* N.P.); involucral bracts subobtus (var. *bohemicum* N.P.) or acute (var. *sudeticum* N.P.); involucre 7.5–8.0 mm long.....520. **H. viscidulum** Tausch

- 451 + Involucral bracts (and peduncles) with sparse to occasional glands (or even completely eglandular).....19.
19. Peduncles glabrous or with occasional hairs; all leaves acute.....20.
- + Peduncles with sparse to scattered hairs; floral bracts greenish; basal leaves spatulate and obtuse (outer) to lanceolate and acute (inner).....523. **H. heothinum** N.P.
20. Peduncles glabrous; floral bracts dark.....521. **H. besserianum** Spreng.
- + Peduncles glabrous or with occasional hairs; floral bracts green with distinct light-colored border.....522. **H. glaucescens** Bess.
- 21 (17). Involucres of medium size, 6.0–6.5 mm long.....22.
- + Involucres small, (4.5–)5–6 mm long.....26.
22. Involucral bracts (and peduncles) with glands to scattered and scattered, short, black hairs 0.5 mm long; floral bracts dark.....524. **H. nigrisetum** N.P.
- + Involucral bracts with glands sparse to absent.....23.
23. Involucral bracts with occasional glands; floral bracts dark.....24.
- + Involucral bracts (and peduncles) eglandular; with occasional or scattered hairs; floral bracts whitish-green. Plants of Caucasus.....528. **H. armeniacum** N.P.
24. Peduncles with scattered glands; stolons slender.....25.
- + Peduncles eglandular; stolons thickish, very long (to as long as stem).....527. **H. megalomastix** N.P.
25. Involucral bracts and peduncles with scattered, black, hairs 2.0–2.5 mm long; outer basal leaves obovate, rounded, inner lanceolate, acute; corollas purple on outside. Plants of Caucasus.....526. **H. hopense** Juxip
- + Involucral bracts with occasional, black hairs 1.0–1.5 mm long; peduncles with sparse hairs 3–5 mm long; all leaves acute; corollas yellow (one-colored).....525. **H. branae** N.P.
- 26 (21). Involucral bracts subobtusate, with sparse to scattered glands.....27.
- + Involucral bracts with occasional glands or eglandular.....28.
27. Peduncles with sparse glands and sparse simple hairs; floral bracts green with pale border.....529. **H. subfiliferum** Zahn
- + Peduncles quite slender, eglandular and glabrous; floral bracts dark.....530. **H. filiferum** Tausch
28. Peduncles with sparse to occasional glands.....29.
- + Peduncles eglandular.....32.
29. Involucral bracts with occasional hairs; peduncles glabrous or with occasional hairs.....30.

- 452 + Involucral bracts and peduncles with scattered to moderate hairs.....31.
30. *Acladium long* (20 mm long); stolons sender, with small, delicate leaves; involucral bracts acute; peduncles with occasional glands. Plants of Baltic Region.....531. **H. amnoon** N.P.
- + *Acladium short* (7 mm long); stolons thickish, with quite large leaves, clustered in rosettes at tips of stolons; involucral bracts obtuse; peduncles with sparse glands. Plants of Caucasus.....533. **H. schemachense** Juxip
31. Basal leaves spatulate and subacute to lanceolate and acute. Plants of Caucasus.....532. **H. substoloniferum** N.P.
- + All basal leaves linear-lanceolate and acute. Plants of European Territory of Soviet Union.....534. **H. volhynicum** N.P.
32. Peduncles glabrous or with occasional hairs; floral bracts dark, with whitish border (as also involucral bracts); leaves with sparse stellate hairs only along midrib; cauline leaves 3-4; *acladium short* (4 mm long).....535. **H. marginale** N.P.
- + Peduncles with sparse to scattered hairs; floral bracts dark, without distinct border; leaves distinctly stellate-hairy beneath (in young leaves also above); cauline leaves 2; *acladium* 15 mm long.....536. **H. pseudauriculoides** N.P.

Cycle 1. Aeriostolonosa Juxip.—*Grex H. aeriostolonum* Zahn in *Plfzr.* IV, 280 (1923) 1416, p. p.—Stolons arising not only from rosettes but also from axils of (lower) cauline leaves; basal leaves mostly many; inflorescence paniculate, sometimes umbellate at top, often with 20-40(-60) capitula. Plant robust, succulent.

505. **H. rojowskii** Rehm. in *Verh. Zool.-bot. Ges. Wien.* XLVII (1897) 288.—*H. pseudosparsum* Zahn in *Fedde, Repert.* III (1907) 184.—*H. erythrophylloides* Zahn, *Hier. fl. Mosquens.* (1911) 38.

Perennial. Stem 30-100 cm high, slender to somewhat thick, reddish at base, very densely to moderately hairy (1-4 mm long), hairs thinning upward and in inflorescence almost absent, eglandular, with scattered stellate hairs; stolons long, more or less whip-like, 2-5, arising not only from rosettes but also from axils of cauline leaves, with quite small, crowded, equal leaves with pubescence of very dense to moderate bristles 1-3 mm long. Basal leaves oblong-lanceolate, acute, glaucous, often reddish, with very scattered bristles 2-5 mm long (often only along margin), without or with scattered (beneath along midrib) stellate hairs; cauline leaves 2-4 (coefficient of leafiness 0.05), in lower half of stem. Inflorescence openly paniculate or umbel-
453 late at top with 20-40(-60) capitula; peduncles without or with sparse

simple hairs, sparsely to moderately glandular, sparsely stellate-hairy. Involucres 5.0–6.5 mm long, cylindrical; involucral bracts narrow to somewhat broad, acute to subobtusate, gray-green to dark, with light-colored border, without or with sparse simple hairs, sparsely to moderately glandular; stellate hairs absent or to moderate. Corollas yellow. Stigmas yellow. Flowering July to August (September).

On sands, along roadsides and embankments, in waste places.—*European Part*: Baltic Region, Upper Volga, Volga-Don, Upper Dniester, Crimea; *Caucasus*: Western Transcaucasia. *General distribution*: Central Europe. Described from Lvov. Type unknown.

Note. Whether this is a separate species still needs to be demonstrated in cultivation. As may be judged from the scant data in the description and from our own observations in nature, all the studied specimens were fall specimens having, as is known, a tendency for vigorous growth.

Cycle 2. Bauhinia.—*Grex H. bauhini* (Bess.) Zahn in Pflzr. IV, 280, 1424.—*H. glaucescens* Froel. in DC. Prodr. VII (1838) 202.—Peduncles densely stellate-hairy or tomentose; inflorescence paniculate or umbellate at top; it ranges westward much farther than Hungary.

506. **H. obscuribracteum** N.P. Hier. Mitteleur. I (1885) 588; Zahn in Pflzr. IV, 280. 1427; Asch. and Graebn. Synopsis, XII, I, 335.

Perennial. Stem 40–70 cm high, somewhat thick, with occasional hairs 2–3 mm long, sparsely glandular above, without stellate hairs; stolons quite long, quite slender, with scattered hairs 1 mm long only toward tip, quite small-leaved. Basal leaves lanceolate, acute, glaucous, only along margin with occasional hairs 1 mm long or more or less glabrous, without stellate hairs; cauline leaves 3 (coefficient of leafiness 0.06). Inflorescence openly paniculate, with 15–25 capitula; floral bracts dark, with light-colored border; peduncles without simple hairs, with scattered glands, densely stellate-hairy. Involucres 6.5–7.0 mm long, cylindrical; involucral bracts narrow, subobtusate, black, with light-colored border, without simple hairs, moderately glandular, with quite sparse stellate hairs. Stigmas yellow. Flowering June to July.

European Part: ?Dvina-Pechora, Upper Dniester. *General distribution*: Central Europe. Described from vicinity of Dresden. Type in Munich.

507. **H. fastigiatum** N.P. Hier. Mitteleur. I (1885) 581; Zahn, Hier. fl. Mosquens. 41; Zahn in Pflzr. IV, 280, 1424; Asch. and Graebn. Synopsis, XII, I, 331.—*H. bauhini* β . *viscidulum* (and *fastigiatum*) Tausch in Flora, XI (1828) Erg.-Bl. 59 p. p.—**Exs.**: Zahn, Hier. Europ. No. 9.

- 454 Perennial. Stem to 60 cm high, 1.0–1.5 mm in diameter, at base with sparse, light-colored, hairs 2–3 mm long, above hairs dark, sparse, with sparse glands, with scattered stellate hairs; stolons quite long and slender, very conspicuously covered with hairs 2–4 mm long, with quite dense small leaves. Basal leaves lanceolate, acute, glaucous, with occasional bristles 2–3 mm long above toward margin, densely hairy along midrib beneath, without stellate hairs, cauline leaves 4 (coefficient of leafiness 0.07). Inflorescence openly pseudo-umbellate, with up to 35 capitula; floral bracts dark, with light-colored border; peduncles without simple hairs, very densely glandular and sparsely stellate-hairy. Involucres 6.5–7.0 mm long, cylindrical; involucre bracts narrow, subacute, dark, with light-colored border; moderately pubescent with dark hairs 1 mm long or with occasional hairs (f. *parcipilum* Sag. and Zahn), very densely glandular, with sparse stellate hairs. Stigmas yellow. Flowering June to July.

European Part: Upper Volga, Crimea; *Caucasus:* Eastern and Western Transcaucasia. *General distribution:* Central Europe, Balkans-Asia Minor. Described from vicinity of Prague. Type in Munich.

508. **H. plicatum** Zahn in Pflzr. IV, 280 (1923) 1429; Asch. and Graebn. Synopsis, XII, I, 338.—*H. plicatum* Tausch ex N.P. Hier. Mitteleur. I (1885) 590, non Lindeb. (1872).—**Exs.:** Fl. Austro-Hung. No. 3314.

Perennial. Stem 40–70 cm high, 1.5–3.0 mm in diameter, at base with sparse, dark hairs 1.0–2.5 mm long, above with sparse glands, without stellate hairs; stolons elongate, somewhat thick, moderately covered with hairs 2–3 mm long only toward tip, with quite small leaves. Basal leaves 3–5, outer lobed or oblong, tapered to base, obtuse, inner lanceolate, acute, often plicate, glaucous with occasional bristles 2–3 mm long above (toward margin), along margin with scattered bristles 4 mm long, without stellate hairs, cauline leaves (1–)2 (coefficient of leafiness 0.03). Inflorescence openly paniculate, with 6–35 capitula; floral bracts light-colored; peduncles with occasional (less often to sparse) hairs, with scattered glands, gray-tomentose. Involucres (6.5–)7–7.5(–8) mm long, ovate-cylindrical; involucre bracts somewhat narrow, subobtusate, dark, with light-colored border, with occasional, 5(2–9), light-colored hairs 1.0–1.5(–2.0) mm long, with occasional, 12(10–15), glands up to 1 mm long, and quite sparse stellate hairs. Stigmas yellow. Flowering June to July.

Dry grassy places, along slopes.—*European Part:* Ladoga-IImen, Volga-Don, Upper Dnieper, Middle Dnieper, Upper Dniester. *General distribution:* Central Europe. Described from vicinity of Prague. Type in Munich.

509. **H. ingricum** N.P. Hier. Mitteleur. I (1885) 589; Zahn in Pflzr. IV, 280, 1427; Asch. and Graebn. Synopsis, XII, I, 336.—**Exs.:** Schweinfurth. Fl. Ingr. No. 373b.

455 Perennial. Stem 30–60 cm high, 1.5–2.0 mm in diameter, with occasional, dark hairs 1.0–2.5 mm long with occasional glands and scattered stellate hairs above; with 3–6 long (to 35 cm), slender stolons with small leaves. Basal leaves 7–10, narrowly lanceolate to linear (10:1), acute, glaucous, almost glabrous (with occasional bristles 1.0–1.5 mm along margin and midrib toward base), without stellate hairs; cauline leaves 3(2–4) (coefficient of leafiness 0.07), in lower half of stem, lanceolate to linear (9:1), glabrous. Inflorescence cymose, more or less compact, with 6–12 capitula; floral bracts gray; peduncles without simple hairs, with occasional to sparse glands, white-tomentose. Involucres (6–)7–8 mm long, cylindrical, truncate; involucre bracts somewhat broad, acute, blackish, with whitish-greenish border, without simple hairs, with sparse to almost scattered, 20(15–25), glands 0.6 mm long, with scattered stellate hairs. Flowering July.

Dry grassy places.—*European Part:* Baltic Region, Ladoga-Ilmen. *General distribution:* Central Europe. Described from former St. Petersburg Province. Type in Munich; paratype in Leningrad.

Note. Apparently, *H. macrum* N.P. (Hier. Mitteleur. I, 589; Zahn in Pflzr. IV, 280, 1427) should be included here. It is distinguished by having peduncles with scattered stellate pubescence and quite slender stolons. It supposedly is found in Ladoga-Ilmen, and Upper Dniester regions. Described from Hungary. Type in Munich.

510. **H. melachaetum** Tausch in Flora, XI (1828) Erg.-Bl. 58; N.P. Hier. Mitteleur. I, 590; Zahn in Pflzr. IV, 280, 1431; Asch. and Graebn. Synopsis, XII, I, 342.—*H. collinum* var. *melachaetum* Rchb. Fl. Germ. excurs. (1830) 261.—*H. floribundum* var. *melachaetum* Fr. Symb. (1848) 17.—**lc.:** Rchb. Ic. Fl. Germ. XIX, 59, 60, t. 116, fig. 11.—**Exs.:** Schweinfurth, Herb. Ingr. exs. No. 373, sub *H. praealto*; Zahn, Hier. Europ. No. 842 (sub var. *β. cymanthoides* Zahn).

Perennial. Stem 40–50 cm high, slender, moderately setose with black-based bristles 2–4 mm long in lower part, with occasional bristles upward and occasional glands above, quite sparsely stellate-hairy; stolons long, slender, with scattered hairs 2.0–2.5 mm long and small leaves. Basal leaves narrowly lanceolate, acute, often long, glaucous, moderately hairy on both sides and along margin with soft hairs 1.5–2.5 mm long or glabrous above, without stellate hairs; cauline leaves 2–3 (coefficient of leafiness 0.06). Inflorescence openly paniculate, with 10–25 capitula; floral bracts light-colored, whitish; peduncles with

sparse to scattered hairs 2–3 mm long and occasional glands, gray-tomentose. Involucres 6.5–7.5 mm long, ovate; involucre bracts narrow, subacute, blackish, with very narrow and light-colored border, with scattered to moderate dark-based hairs 1.5 mm long, with occasional glands and very sparse stellate hairs. Stigmas yellow. Flowering June to July.

456 *European Part*: Baltic Region. *General distribution*: Central Europe. Described from vicinity of Prague. Type unknown.

511. **H. thaumasioides** N.P. Hier. Mitteleur. I (1885) 583; Zahn, Hier. fl. Mosquens. 40; Pflzr. IV, 280, 1426; Asch. and Graebn. Synopsis, XII, 333.—*Exs.*: Fl. Austro-Hung. No. 3044, I; Baenitz. Herb. Europ. No. 6335, Dörfler, No. 3957; Petrak, No. 993.

Perennial. Stem (50–)60–75 cm high, slender to somewhat thick, sometimes with occasional, light-colored hairs 1.0–2.5 mm long at base, glabrous upward, eglandular, with sparse stellate hairs above; stolons long, slender, with scattered hairs 1.0–1.5 mm long, with more or less long, narrow, scattered stellate-hairy leaves. Basal leaves lanceolate to linear-lanceolate, subacute (10–17:1), glaucous, along margin with sparse bristles 2.0–2.5 mm long, scattered along midrib, very sparsely stellate-hairy beneath; cauline leaves 2(–3) (coefficient of leafiness 0.03). Inflorescence openly paniculate, with 15–35 capitula; floral bracts gray; peduncles slender without or with occasional simple hairs, almost eglandular, gray from stellate hairs. Involucres (5.5–)6–7 mm long, cylindrical, truncate, involucre bracts narrow, acute, greenish-gray, with light-colored border, without or with occasional (1–3) simple hairs, very sparsely (4–9) glandular, glands 0.5 mm long, with sparse stellate hairs. Stigmas yellow. Flowering June to July.

Dry meadows and along forest edges.—*European Part*: Upper Volga, Volga-Don regions. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Bavaria. Type in Munich.

512. **H. cymanthum** N.P. Hier. Mitteleur. I (1885) 582; Zahn in Pflzr. IV, 280, 1425; Asch. and Graebn. Synopsis, XII, I, 333.—*Exs.*: Rehm. and Wol. Fl. Pol. exs.: No. 967.

Perennial. Stem 45–60 cm high, 1.0–1.5 mm in diameter, with occasional setaceous hairs 1–2 mm long, mainly in lower part; stolons quite long, very slender, with sparse hairs 1 mm long. Leaves quite large; basal leaves spatulate-lanceolate and obtuse to narrowly lanceolate and acute, gray-green, moderately hairy above with hairs 2–3 mm long, with hairs scattered and dense along midrib, sparsely stellate-hairy beneath; cauline leaves 2 (coefficient of leafiness 0.04). Inflorescence openly paniculate-umbellate, with 8–20(–35) capitula; floral bracts gray;

peduncles with sparse hairs 0.5 mm long, eglandular, tomentose. Involucres 6–7 mm long, cylindrical; involucral bracts narrow, acute, gray-green, with light-colored border, with scattered hairs 1 mm long, and sparse glands, densely stellate-hairy, hence appearing gray. Stigmas yellow. Flowering June to July.

European Part: Crimea; *Caucasus:* Western Transcaucasia.

General distribution: Central Europe, Mediterranean, Balkans-Asia Minor. Described from Hungary. Type in Munich.

- 457 513. **H. cymanthodes** Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 5; Zahn in Pflzr. IV, 280, 1424.

Perennial. Stem 35–70 cm high, 1–2 mm in diameter, more or less scattered-setose at base, glabrous above, more or less eglandular, somewhat stellate-hairy; stolons slender. Basal leaves 5–6, narrowly lanceolate, often quite long, moderately pubescent, moderately stellate-hairy beneath; cauline leaves (1–)2–5 (coefficient of leafiness 0.06), abruptly reduced. Inflorescence paniculate-umbellate, with 6–20 capitula; peduncles without simple hairs, with sparse glands, gray from stellate hairs. Involucres 5.0–5.5 mm long; involucral bracts narrow, acute, greenish, without simple hairs, with scattered glands 0.4–0.5 mm long, with scattered stellate hairs. Stigmas yellow. Flowering June to July.

Middle montane zone.—*Caucasus:* Eastern Transcaucasia. Endemic. Described from Bakuriani. Type unknown.

514. **H. thaumasium** N.P. Hier. Mitteleur. I (1885) 583; Zahn, Hier. fl. Mosquens, 41; Pflzr. IV, 280, 1425; Asch. and Graebn. Synopsis, XII, I, 331.—*Exs.:* Hier. Naeg. No. 130; Baenitz, Herb. Europ. No. 5766; Fl. Austro-Hung. exs. No. 3043; Doerfler, No. 3157; GRF No. 2213; Zahn, Hier. Europ. No. 221.

Perennial. Stem 30–70 cm high, slender, with occasional, light-colored or more or less conspicuous (f. *pilosicaule* Peter) hairs (1–)2.5–4.0 mm long, with sparse glands spreading downward beyond middle of stem, stellate-hairy above; stolons very long and slender, with conspicuous hairs 1 mm long and small-leaved. Basal leaves 3–11, narrowly-lanceolate to linear (11.5:1), acute, glaucous, almost glabrous or with occasional hairs 1.0–1.5 mm long along margin, sparsely hairy along midrib, scatteredly stellate-hairy beneath; cauline leaves 2–4 (coefficient of leafiness 0.06), lanceolate to linear (10:1), almost glabrous, with rare stellate hairs beneath. Inflorescence openly paniculate-umbellate, with 10–30 capitula; floral bracts dark; peduncles without simple hairs, with scattered to moderate glands, gray-tomentose. Involucres 5 or 6 mm long (leaves on both sides with stellate

hairs—f. *microcephalum* N.P.); involucre bracts narrow, acute, blackish, with light-colored border, without or often with occasional, light-colored, simple hairs 1.0–2.5 mm long, sparsely, 15(10–25), glandular, glands 0.4–0.5 mm long, very densely stellate-hairy. Stigmas yellow. Flowering June to July.

Edges of open forests, edges of marshes and meadows.—*European Part*: Baltic Region, Upper Volga, Upper Dnieper, Middle Dnieper Volga-Don regions. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Austria. Type in Munich.

515. **H. stauroplitanum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 527.

- 458 Perennial. Stem to 65 cm high, 3 mm in diameter, with scattered hairs to 3 mm long, with occasional glands upward, sparsely stellate-hairy; stolons slender, to 1/4 as long as stem, conspicuously pubescent (denser than stem), with remote, quite large, narrowly lanceolate leaves to 9 cm long; leaves on both sides to moderately pubescent, without hairs above, sparsely stellate-hairy beneath. Basal leaves to 6, spatulate to lanceolate, subobtuse to acute, to 18 cm long (9:1), glaucous, with sparse hairs 2.5 mm long above, hairs moderate, 1.5 mm long beneath, dense on midrib beneath, 2.5 mm long, with sparse hairs 1 mm long along margin (near base), as a whole pubescence to moderate, with hairs above, stellate-hairy beneath, cauline leaves 4 (coefficient of leafiness 0.06), narrowly lanceolate (11–12:1), acuminate, pubescence almost as on basal leaves. Inflorescence paniculate-umbellate, compact, with up to 13 capitula; peduncles with sparse, dark hairs 3 mm long and scattered glands 0.3 mm long, tomentose; floral bracts dark, aelodium 5 mm long. Involucres 6 mm long; involucre bracts acute, with sparse, 20–25, hairs 2 mm long and equally sparse, 14–20, glands 0.3 mm long, sparsely stellate-hairy. Stigmas yellow.

Caucasus: Ciscaucasia. Endemic. Described from vicinity of Stavropol. Type in Baku.

Note. It is distinguished from *H. thaumasium* by the large leaves of the stolons and the hairy peduncles.

516. **H. arborum** N.P. Hier. Mitteleur. I (1885) 586; Dahlst. Beitr. Hier.-Fl. Oesels, 23; Zahn in Pflzr. IV, 280, 1428; Asch. and Graebn. Synopsis, XII, I, 336.—**lc.**: Zahn in Hegi, Ill. Fl. VI, 1239, fig. 882.—**Exs.**: Hier. Naeg. No. 205; Zahn, Hier. Europ. Nos. 128, 325, 530, 841; Hayek, Fl. Styr. exs. Nos. 600, 1098.

Perennial. Stem 30–80 cm high, 2 mm in diameter, with occasional hairs 1.0–2.5 mm long, light-colored in lower part of stem and dark above, with occasional glands above; stolons long, to 30 cm long, very

slender, quite small-leaved, with scattered hairs 1–2 mm long, sometimes at tip with undeveloped inflorescence. Basal leaves 4–11, spatulate and obtuse to linear-lanceolate and acute, narrow (11:1), glaucous, with occasional bristles 2.0–2.5 mm long along margin and midrib beneath, without stellate hairs (f. *nudifolium* N.P.) or with sparse hairs beneath (f. *floccifolium* N.P.); cauline leaves 2–4 (coefficient of leafiness 0.05), linear (12–13:1), acute. Inflorescence openly paniculate, almost umbellate at top, with 10–50 capitula; floral bracts light-colored; peduncles without or with occasional simple hairs, moderately glandular, glands 0.4 mm long, gray-tomentose. Involucres (5.5) 6.0–6.5(–7.0) mm long, cylindrical; involucre bracts somewhat broad, subacute, dark, with light-colored border, with occasional to sparse (10–15), dark, simple hairs 2.5 mm long, and occasional to almost scattered (10–25), glands 0.4 mm long, and almost without stellate hairs. Stigmas yellow. Flowering June to July.

459 Dry grassy places, old fields.—*European Part*: Upper Volga, Baltic Region; *Caucasus*: Ciscaucasia. *General distribution*: Central Europe. Described from Germany. Type in Munich.

517. **H. insolens** Norrl. Nya nord. Hier. I (1904) 75; in Mela-Cajander, Suom. Kasvio, 652; Zahn in Pflzr. IV, 280, 1430.—**Exs.**: Norrl. Hier. exs. fasc. IV, No. 21; Lindberg, Pl. Finl. exs. No. 1614.

Perennial. Stem 30–60 cm high, 1.5 mm in diameter, colored, with occasional bristles 3–4 mm long and occasional glands; stolons 2–5, slender, long, with narrowly lanceolate, linear to filiform leaves. Basal leaves 4–7, lanceolate to linear, acute (13:1), glaucous, glabrous or with occasional hairs at base; cauline leaves 2–4 (coefficient of leafiness 0.07), narrowly lanceolate (11.5:1), glabrous. Inflorescence paniculate, with 7–18 capitula; floral bracts dark; peduncles with occasional simple hairs and occasional glands, tomentose. Involucres 5–6 mm long; involucre bracts somewhat broad, acute, black, scarcely bordered, with occasional, 10(5–12), dark, simple hairs 2 mm long and occasional to sparse, 12(6–23), glands 0.4 mm long, with sparse stellate hairs. Stigmas yellow. Flowering July.

In scrubs, dry sandy places.—*European Part*: Baltic Region, Ladoga-Ilmen (northern part). *General distribution*: Scandinavia (Finland) Described from Finland. Type in Helsinki.

Note. *H. seduthrix* Rehm. (*Verh. Zool.-Bot. Ges. Wien*, XLVII, 295; *Pflzr.* IV, 280, 1430) is very close to this species. It was described from the former Minsk Province and possibly can be found in the Upper Dnieper and Upper Dniester regions (compare Rehm. and Wol. *Fl. Pol.* exs. No. 192). Type in Lvov.

518. **H. hispidissimum** Rehm. in Östr. Bot. Zeitschr. (1873) 153; N.P. Hier. Mitteleur. I, 582; Zahn, Hier. fl. Mosquens. (1911) 40; Zahn in Pflzr. IV, 280, 1425; Asch. and Graebn. Synopsis, XII, I, 332.—**Exs.:** Baenitz, Herb. Europ. No. 9472; Hayek, Fl. stir. exs. No. 1097.

Perennial. Stem 25–60 cm high, slender, with ?spreading hairs 1.0–2.5 mm long (f. *pilosicaule* N.P.) or with sparse hairs (f. *calvicaule* N.P.), eglandular, to densely stellate-hairy; stolons long, slender, covered with hairs 1.0–2.5 mm long, small-leaved. Basal leaves lobed and obtuse to narrowly lanceolate and subacute, glaucescently yellow-green, with bristles 3.5 mm long, pubescence scattered beneath, to dense along midrib, as a whole moderately, stellate-hairy beneath; cauline leaves 2 (coefficient of leafiness 0.06), small. Inflorescence cymose, more or less compact, with 20–40 capitula; floral bracts gray; peduncles with very dense hairs 1 mm long, but with occasional glands or eglandular, gray-tomentose. Involucres 6 mm long, cylindrical-ovate; involucre bracts narrow, acute, gray, with very narrow border, with
460 many hairs 1 mm long, but with occasional glands and sparse stellate hairs. Stigmas yellow. Flowering June to July.

Dry grassy and stony places.—*European Part:* Baltic Region, Volga-Don, Upper Volga, Upper Dnieper, Upper Dniester regions; *Caucasus:* Western Transcaucasia. *General distribution:* Central Europe, Balkans-Asia Minor. Described from Galicia. Type in Lvov?

Note. *H. callicymum* Rehm. (in *Verh. Zool.-Bot. Ges. Wien*. XLVII, 293; Zahn in *Pflzr.* IV, 280, 1425) is close to this species. It is distinguished by having a less dense, graceful inflorescence with 12–20 capitula and longer, dark hairs 2–3 mm long on the involucre bracts. It is found in the Upper Dniester Region. Type in Lvov.

519. **H. rubro-bauhini** Schelk. and Zahn in *Vestn. Tifl. Bot. Sada*, XXI (1912) 3 and XXIX (1913) 4; Zahn in *Pflzr.* IV, 280, 1432.

Perennial. Stem (20–)45–55 cm high, 1.0–2.5 mm in diameter, distinctly setose at base, with or without occasional hairs above, eglandular, almost without stellate hairs; stolons elongated, slender, slightly hairy, with quite small or medium-sized leaves. Basal leaves 3–9, spatulate lanceolate to lanceolate, up to 12 cm long (7.5:1), reddish, glabrous above or with occasional hairs toward margin, moderately setose beneath and along margin with bristles 3–4 mm long, without stellate hairs beneath or weakly hairy along midrib; cauline leaves 2–4 (coefficient of leafiness 0.06), quite small. Inflorescence openly paniculate, umbellate at top with 5–20(–40) capitula; floral bracts dark; peduncles quite slender, without or with occasional simple hairs, eglandular, gray-pubescent. Involucres 5.0–5.5(–6.0) mm long, cylindrical-ovate; involucre bracts somewhat broad, subobtuse, dark, with

bright green border, sparsely dark-hairy, very sparsely glandular, somewhat stellate-hairy at base. Corollas yellow, with red stripes outside in ray florets or sometimes without stripes (f. *exstriatum* Zahn). Stigmas yellow. Flowering May to July.

Middle montane zone, in forests and along forest edges.—*Caucasus*: Dagestan, Eastern, Western and Southern Transcaucasia, Talysh. *General distribution*: Balkans-Asia Minor. Described from vicinity of Kirovabad. Type unknown.

Note. The material of this species in the herbarium of the Botanical Institute of the Academy of Sciences of the USSR was very meager and, in addition, was very inadequately labeled (e.g., the specimen collected by Akinfiev on July 3, 1890 bears the label "Caucasus"!). In all respects, the species is similar to ordinary species (without red stripes) of subsection *Bauhinia*, and in the case of poorly dried plants or specimens past flowering, it is indistinguishable from the yellow-flowered species. Consequently, it is essential to pay attention to the color of the corollas in the living plants and make corresponding notes on the labels in the field.

Cycle 3. Magyarica Juxip.—*Grex H. magyricum* (N.P.) Zahn in Pflzr. IV, 280, 1418.—Peduncles almost without or with sparse stellate hairs; habit similar to *H. florentinum* but only with long, slender, leafy stolons.

520. *H. viscidulum* Tausch in Flora, XI (1828) Erg.-Bl. 59 p. p.; N.P. Hier. Mitteleur. I (1885) 589; Zahn in Pflzr. IV, 280, 1428; Asch. and Graebn. Synopsis, XII, I, 338.—*Exs.*: Petrak, No. 272; GRF Nos. 1808, 1280, 1281 p. p.

Perennial. Stem 50 cm high, somewhat slender, sparsely covered with dark hairs 1–2 mm long at base, upward almost glabrous with occasional glands, almost without pubescence; stolons long, slender, with hairs 1.5–3.0 mm long and small-leaved. Basal leaves oblong, tapered to base, subobtusate, with sparse bristles 3–4 mm long above, along midrib scattered-setose, without stellate hairs; cauline leaves 3 (coefficient of leafiness 0.06). Inflorescence openly paniculate, with 30 capitula; floral bracts green (var. *bohemicum* N.P.) or dark brown (var. *sudeticum* N.P.); peduncles thickish, without simple hairs, scattered-glandular, with very sparse stellate hairs. Involucre 7.5–8.0 mm long, cylindrical; involucre bracts somewhat broad, subobtusate, black, with light-colored border (var. *bohemicum* N.P.) or acute, dark, without border (var. *sudeticum* N.P.), with occasional, dark hairs, quite densely glandular, almost without stellate hairs. Stigmas yellow. Flowering June to July.

Dry meadows, mountains to middle zone (to 1200 m).—*European Part*: Baltic Region, Upper Volga, Upper Dniester regions. *General distribution*: Central Europe. Described from Prague. Type in Munich.

Note. The specimens issued under GRF numbers 1280, 1281 do not correspond with the description of *H. viscidulum* Tausch (l. c.); the reported length of the involucre was 5.5 mm and the ratio of the number of hairs to glands on the involucral bracts was on average 50:50 (instead of 10:90) and so on.

521. *H. besserianum* Spreng. Syst. III (1826) 639; N.P. Hier. Mitteleur. I, 572; Zahn, Hier. fl. Mosquens. 38; Pflzr. IV, 280, 1418; Asch. and Graebn. Synopsis, XII, I, 321; non Host. (1831).—? *H. piloselloides* Boiss. Fl. or. III (1875) 863.

Perennial. Stem 40–70 cm high, to 2.5 mm in diameter, with occasional hairs 2.5 mm long and (sometimes) with occasional glands above; stolons to 30 cm long, with scattered hairs 2–3 mm long; three types of stolons can be observed: 1) slender, with small leaves as in *H. amnoon*; 2) thicker with larger leaves, and, finally, 3) stolons with rosette at tip. Basal leaves 2–11, lanceolate to linear, narrow (12:1), to 12 cm long, acute, glaucous, almost glabrous, with occasional hairs 3–5 mm long along margin and midrib beneath near base; cauline leaves 2–4 (coefficient of leafiness 0.06), linear-lanceolate, acute. Inflorescence openly paniculate, with 12–30(–70) capitula, with branches
462 surpassing long (12–30 mm long) acladium; floral bracts dark; peduncles without simple hairs, with occasional to sparse glands and sparse stellate hairs. Involucres 6.0–7.5 mm long, cylindrical; involucral bracts somewhat narrow, acuminate, dark with green border, with occasional (7) dark hairs 1.5–3.5 mm long and occasional (8) glands 0.4 mm long, almost without stellate hairs. Tips of ligules often greenish. Stigmas yellow. Flowering June to July.

European Part: Upper Volga, Upper Dnieper, Baltic, Upper Dniester regions; *Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Germany? Type in Munich.

522. *H. glaucescens* Bess. Prim. fl. Galic. II (1809) 150.—*H. magyaticum* N.P. Hier. Mitteleur. I (1885) 576; Zahn; Hier. fl. Mosquens. 39; Pflzr. IV, 280, 1421.—*H. eu-magyaticum* Zahn in Asch. and Graebn. Synopsis, XII, I (1929) 326.—**Exs.**: Naeg. Hier. exs. No. 38; GRF No. 1809.

Perennial. Stem 60–80 cm high, 1.5–2.0 mm in diameter, glabrous and eglandular, also without stellate hairs; stolons very long, quite slender (0.5 mm in diameter), with very sparse or to scattered hairs

1 mm long, small-leaved, sometimes with undeveloped inflorescence at tip. Basal leaves lanceolate to oblong-lanceolate, mostly acute to very acute, glaucous, glabrous, with occasional bristles 2–4 mm long only along margin at base; cauline leaves 2–6 (coefficient of leafiness 0.06). Inflorescence openly paniculate (to almost umbellate), with 10–50 capitula; floral bracts green; peduncles slender, without or with occasional simple hairs, sparsely, finely, dark-glandular (less often scattered), very sparsely stellate-hairy. Involucres 6–7 mm long, cylindrical; involucre bracts narrow, acute, green, with conspicuous light-colored border, glabrous or with occasional, light-colored, simple hairs 1.0–1.5 mm long or somewhat more pubescent (f. *pilosius* N.P.), with sparse to scattered glands, without stellate hairs. Stigmas yellow. Flowering June to July. (Plate XXXVII, Fig. 1.)

Dry grassy, sandy, and stony, open places.—*European Part*: Upper Volga, Upper Dniester, Crimea; *Caucasus*: Eastern Transcaucasia, Dagestan. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Galicia? Type in Munich.

523. **H. heothinum** N.P. Hier. Mitteleur. I (1885) 575; Zahn, Hier. fl. Mosquens. 39; Pflzr. IV, 280, 1421; Asch. and Graebn. Synopsis, XII, I, 327.—*Exs.*: Naeg. Hier. exs. No. 299; GRF Nos. 1279, 2062, 2210; Zahn, Hier. Europ. 125, 728a; Baenitz, Herb. Europ. exs. No. 7384; Dörfler, Herb. norm. No. 3059; Petrak, Fl. bohem. et morav. exs. No. 1173.

463 Perennial. Stem 25–75 cm high, 1.0–1.5 mm in diameter, mostly glabrous or with occasional hairs 2.5 mm long, eglandular, and without stellate hairs; stolons to 25 cm long, very slender, often distinctly pubescent with bristles 2.0–2.5 mm long, small-leaved. Basal leaves 3–7, spatulate and obtuse to narrowly lanceolate and acute, to 8 cm long (8–16:1), glaucous-green along margin, toward base with bristles 2.0–2.5 mm long; cauline leaves 3(2–5) (coefficient of leafiness 0.07). Inflorescence openly paniculate or umbellate at top, with (6–)15–20(–50) capitula; floral bracts greenish; peduncles with sparse to scattered, light-colored hairs 2 mm long, eglandular or with sparse glands, with sparse stellate hairs. Involucres 6.5–7.0 mm long, cylindrical, or 5.0–5.5 mm long and with shorter (6–10 mm long) acladium (f. *vistuligerum* N.P.); involucre bracts narrow, subacute, gray-green, with green border, with very sparse, 7(3–14), hairs 1.0–2.5 mm long and very sparse, 9(7–11) (or somewhat denser—f. *glandulosiceps* Zahn), glands 0.4 mm long, almost without stellate hairs. Stigmas yellow. Flowering June to July.

Dry, grassy, sandy, and stony places.—*European Part*: Baltic Region, Upper Volga, Upper Dnieper; *Caucasus*: Eastern and Western

Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Hungary. Type in Munich.

Note. *H. pseudothaumasium* Zahn (GRF No. 1808a, b) probably should be included here. It is distinguished by having subobtuse involucre bracts, an inflorescence with 5–15 capitula, involucre 5.5–6.0 mm long, and very weak stellate pubescence (leaves without hairs). Described from the Kalinin Region. Type in Leningrad.

524. **H. nigrisetum** N.P. Hier. Mitteleur. I (1885) 573; Pflzr. IV, 280 1419; Asch. and Graebn. Synopsis, XII, I, 323.

Perennial. Stem 45–55 cm high, slender, with occasional black hairs and occasional glands in upper part, hairs thinning downward; stolons quite long, very slender, with sparse, short hairs 0.5–1.0 mm long. Basal leaves narrowly lanceolate, subobtuse, glaucous, with occasional hairs, 1 mm long only along margin at base; cauline leaves 2 (coefficient of leafiness 0.04), linear. Inflorescence umbellate-paniculate, with short (10 mm long) acladium, with 20–40 capitula; floral bracts dark, with light-colored border; peduncles quite slender, with scattered bristles, 2 mm long and sparse to scattered glands, sparsely stellate-hairy below capitula. Involucre 6.0–6.5 mm long, cylindrical; involucre bracts narrow, acute, black, with broad whitish border, with up to scattered simple hairs 0.5 mm long, and equally scattered glands, without stellate hairs. Stigmas yellow. Flowering June to July.

Dry grassy places.—*European Part*: Upper Dnieper, Middle Dnieper, Upper Dniester, Crimea. *General distribution*: Central Europe, Balkans-Asia Minor. Described from vicinity of Vienna. Type in Munich.

Note. Probably, *H. fastigiatiforme* Zahn (*Vestn. Tifl. Bot. Sada*, 29, 4; *Pflzr.* IV, 280, 1419) should be included here. It is distinguished by having more or less dense glands in the inflorescence. Described from Lake Gek-Gel in Karabakh; var. *subglandulosum* Zahn is a less densely
464 glandular variety from Ai-Daraz near Gandzha. Type unknown.

525. **H. branae** N.P. Hier. Mitteleur. I (1885) 578; Pflzr. IV, 280, 1423; Asch. and Graebn. Synopsis, XII, I, 329.

Perennial. Stem 50–60 cm high, slender, with very sparse hairs 2.0–2.5 mm long, glabrous below and eglandular above; stolons very long, slender, quite densely hairy, hairs 2–3 mm long, small-leaved. Basal leaves narrowly lanceolate, acute, glaucescent, with sparse bristles 1.0–2.5 mm long along margin, scattered bristles along midrib beneath; cauline leaves 2 (coefficient of leafiness 0.04). Inflorescence paniculate, more or less crowded, with 10–20 capitula; floral bracts blackish; peduncles with sparse, black, simple hairs 3–5 mm long, with scattered

glands abruptly thinning downward, with scattered stellate hairs. Involucres 6.0–6.5 mm long, cylindrical; involucral bracts narrow, subobtusate, black, with somewhat greenish border, with occasional, black, simple hairs 1.0–1.5 mm long and occasional glands, more or less without stellate hairs. Stigmas yellow. Flowering July.

Caucasus: Ciscaucasia. *General distribution*: Central Europe. Described from western Carpathian Mountains (Bran). Type in Munich.

526. **H. hopense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 528.

Perennial. Stem 25–35 cm high, to 2.5 mm in diameter, dull violet in upper part, with sparse hairs 2.5 mm long, eglandular and without stellate hairs; stolons long (to half as long as stem), slender, stiff, with small, lanceolate, almost glabrous leaves (leaves hairy only along margin and along midrib beneath near base, with quite sparse cilia 2.5–1.5 mm long); however, stolons may even be absent in stunted specimens. Basal leaves 4–8, obovate to lanceolate and acute, glaucous-violet, with reddish midrib beneath, almost glabrous (pubescence as on leaves of stolons); cauline leaves 1 (coefficient of leafiness 0.03), narrowly-lanceolate (11:1), near basal rosette, glabrous. Inflorescence paniculate-umbellate, with 2–7 capitula; peduncles with up to scattered simple hairs 2.5 mm long and equally scattered glands 0.3 mm long, with scattered stellate hairs; floral bracts dark; acladium 6 mm long. Involucres 6.5 mm long; involucral bracts dark, with light-colored border, acuminate with red cusp, with scattered (25–40) dark hairs 2 mm long, and with occasional (10–12) glands 0.3–0.4 mm long, without stellate hairs. Corolla teeth purple outside. Stigmas yellow. Flowering May to June.

Caucasus: Western Transcaucasia (vicinity of Batumi), collected on May 7, 1932, by P. Yaroshenko. Type in Baku.

Note. It is distinguished from the closely related *H. branae* N.P. by
465 involucral bracts and peduncles with scattered hairs 2.0–2.5 mm long; outer basal leaves obovate but inner acute; corolla purple outside.

527. **H. megalomastix** N.P. Hier. Mitteleur. I (1885) 573; Zahn in Pflzr. IV, 280, 1418; Asch. and Graebn. Synopsis, XII, I, 322.

Perennial. Stem 35–65 cm high, slender, at base crowded with sparse to scattered light-colored hairs 2–5 mm long with dark base, above with occasional, black hairs 2.0–3.5 mm long, eglandular and almost without stellate hairs; stolons very long (to 6 cm), thickish, moderately covered with bristles 3–4 mm long, small-leaved. Outer basal leaves obovate or spatulate, rounded-obtusate, inner ones lanceolate, acute, glaucous, above or along margin with sparse bristles

3–4 mm long, with occasional bristles beneath, along midrib moderately hairy, without stellate hairs; cauline leaves 2–4 (coefficient of leafiness 0.05), lanceolate, with quite sparse hairs along midrib beneath. Inflorescence umbellate-paniculate, with short (10 mm long) akladium, with 20–30 capitula; floral bracts dark; peduncles scattered-hairy, eglandular, very sparsely stellate-hairy (somewhat more below capitula). Involucres 6.0–6.5 mm long, cylindrical; involucre bracts narrow, acute, blackish, somewhat green-bordered, with sparse black hairs 2–3 mm long and occasional glands, almost without stellate hairs. Stigmas yellow. Flowering June to July.

Dry grassy places, mountain slopes.—*European Part*: Baltic Region, Upper Dnieper, Upper Dniester, Bessarabia, Crimea; *Caucasus*: Eastern Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Hungary. Type in Munich.

528. **H. armeniacum** N.P. Hier. Mitteleur. I (1885) 579; Zahn in Pflzr. IV, 280, 1423.

Perennial. Stem 50–60 cm high, ascending, thickish, glabrous; stolons long, quite slender, with sparse hairs 1.0–1.5 mm long and small-leaved. Basal leaves lanceolate, more or less acute, glaucous, along margin and midrib beneath with occasional bristles 3–4 mm long; cauline leaves 2 (coefficient of leafiness 0.04). Inflorescence paniculate, more or less compact, with up to 40 capitula; floral bracts whitish-green; peduncles glabrous and eglandular, with scattered stellate hairs. Involucres 6.0–6.5 mm long, ovate; involucre bracts narrow, acuminate, dark green, with narrow white border, with occasional, dark hairs 0.5 mm long or with scattered hairs (var. *pilosiceps* Zahn.), eglandular, with scattered stellate hairs. Stigmas yellow. Flowering June to July.

Dry mountain slopes.—*European Part*: Crimea; *Caucasus*: Western Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern Anatolia). Described from Aegina. Type in Munich.

466 529. **H. subfiliferum** Zahn in Sched. HFR VII (1911) 90; Pflzr. IV, 280, 1421.—*Exs.*: GRF No. 2212.

Perennial. Stem 20–40 cm high, 1.0–1.5 mm in diameter, with occasional hairs 2–3 mm long and in upper part with occasional glands, sparsely stellate-hairy; stolons to 25 cm long, quite slender, small-leaved. Basal leaves 3–7, spatulate-lanceolate and obtuse to lanceolate and acute, to 11 cm long (8–16:1), glaucescent, with occasional bristles 2–3 mm long along midrib beneath, without stellate hairs; cauline leaves (1–)2(–3) (coefficient of leafiness 0.05), mostly small. Inflorescence openly paniculate, umbellate at top, with 5–15 capitula; floral bracts green with light-colored border; peduncles with occasional hairs

and to sparse glands, with scattered stellate hairs below capitula, to sparse downward. Involucres 5.0–5.5 mm long, cylindrical-ovate; involucre bracts somewhat broad, subobtusate, dark green, with pale green border, with occasional, 7(5–10), hairs 2 mm long, and occasional, 7(4–10), glands 0.4 mm long, stellate-hairy. Stigmas yellow. Flowering June to July.

Dry meadows.—*European Part*: Ladoga-Ilmen. Endemic? Described from vicinity of Pskov. Type in Leningrad.

530. **H. filiferum** Tausch in Flora, XI (1828) Erg.-Bl. 59; N.P. Hier. Mitteleur. I, 576; Zahn, Hier. fl. Mosquens. 40; Pflzr. IV, 280, 1420; Asch. and Graebn. Synopsis, XII, I, 325.—*Exs.*: Dörfler, No. 3156; Zahn, Hier. Europ. No. 126.

Perennial. Stem 35–55 cm high, 1.0–1.5 mm in diameter, with occasional dark hairs, eglandular, without stellate hairs; stolons quite long and slender, filiform, very sparsely hairy, small-leaved. Basal leaves narrowly or linear-lanceolate, acute (only outer leaves subacute), gray-green, with hairs 2–3 mm long only along margin, without stellate hairs at base of leaves; cauline leaves 2–3 (coefficient of leafiness 0.06). Inflorescence openly paniculate, with 5–15(–20) capitula; floral bracts dark; peduncles very slender, glabrous and eglandular, with very scattered stellate hairs. Involucres 5.0–5.5 mm long, cylindrical; involucre bracts narrow, subobtusate, dark, with green border, with occasional, 10(7–12), hairs 1.0–2.5 mm long and occasional (4–5) glands 0.4 mm long, almost without stellate hairs. Corollas light yellow. Stigmas yellow. Flowering June to July.

Dry grassy glades.—*European Part*: Baltic Region, Upper Volga, Upper Dnieper, Middle Dnieper, Volga-Don, Upper Dniester, Crimea; *Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Hungary. Type in Munich.

531. **H. amnoon** N.P. Hier. Mitteleur. I (1885) 572; Dahlst. Beitr. Hier.-Fl. Oesels, 23; Zahn in Pflzr. IV, 280, 1418; Asch. and Graebn. Synopsis, XI, I, 322.

467 Perennial. Stem 20–70 cm high, 1.5 mm in diameter, with occasional hairs, with occasional glands above (at first glance glabrous); stolons long (to 25 cm long), slender, with small, linear-lanceolate, graceful (to 24) leaves; sometimes slender branches to 5 cm long arise from axils of leaves bearing undeveloped inflorescences at their tips, hence stolons appear branched (var. *callunetorum* Juxip). Basal leaves 2–10, narrowly lanceolate or linear, to 14 cm long (10–12:1); acute, glaucous, almost completely glabrous (occasional hairs along margin at base and beneath along midrib); cauline leaves 2–3 (coefficient of leafiness

0.05), lanceolate to linear, glabrous. Inflorescence paniculate-umbellate, with 5–40 capitula; acladium long (15–25 mm); peduncles glabrous (or with 1–2 hairs), with occasional glands and quite sparse stellate hairs; floral bracts dark. Involucres 5.5–6.5 mm long, cylindrical; involucre bracts lanceolate, acute, dark, with green border, with occasional, 7(4–13), hairs 2 mm long and equally occasional, 10(3–15), glands 0.3 mm long, almost without stellate hairs. Tips of ligules often dull green. Stigmas yellow. Flowering June to July.

Dry meadows, forest edges, open, sunny places.—*European Part*: Baltic Region. *General distribution*: Central Europe. Described from Hungary. Type in Munich.

532. *H. substoloniferum* N.P. Hier. Mitteleur. I (1885) 581; Zahn in Pflzr. IV, 280, 1424.

Perennial. Stem 30–75 cm high, 1–3 mm in diameter, with sparse bristles 3–4 mm long and in upper part with occasional glands, without stellate hairs; stolons quite long, slender, moderately covered with bristles 2 mm long. Basal leaves 2–8, spatulate and subacute to narrowly lanceolate and acute, to 12 cm long (9:1), glaucous, with sparse bristles 3–4 mm long above toward margin, along margin and midrib, without stellate hairs; cauline leaves 2–4(–7) (coefficient of leafiness 0.09). Inflorescence paniculate-umbellate, with 8–35 capitula; floral bracts light-colored; peduncles slender, with scattered pubescence, sparsely glandular, and very sparsely stellate-hairy. Involucres (4.5)5.5–6.5 mm long, cylindrical; involucre bracts narrow, subacute, dark green, with light-colored border, with sparse, 10(7–18), light-colored or dark hairs 1–3 mm long, almost eglandular (0–4), without stellate hairs. Stigmas yellow. Flowering June to July.

Open grassy places, subalpine meadows.—*Caucasus*: Eastern and Western Transcaucasia. *General distribution*: Balkans-Asia Minor. Described from Balkans. Type in Munich.

533. *H. schemachense* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 528.

468 Perennial. Stem to 55 cm high, 2.5 mm in diameter, glaucous, with sparse, simple hairs 2–3 mm long, with occasional glands above, without stellate hairs; stolons many, to half as long as stem, somewhat thick, stiff with remote, broadly lanceolate (4:1) leaves to 4 cm long, clustered, besides in rosettes (6–8), at tips of stolons, with scattered bristles 5 mm long above, glabrous beneath, with occasional hairs 3 mm long along margin and midrib beneath, as a whole sparsely hairy, without stellate hairs. Basal leaves to 7, spatulate to lanceolate (9:1), glaucous, to 10 cm long, pubescence as on leaves of stolons; cauline



leaves 2 (coefficient of leafiness 0.04), narrowly lanceolate (11:1), small, almost glabrous. Inflorescence paniculate, with remote lower branch, with up to 23 capitula; peduncles glabrous, only acladium with occasional hairs 3 mm long, with sparse glands 0.3 mm long, almost without stellate hairs; acladium short (7 mm long). Involucres 5.5 mm long; involucre bracts obtuse, with occasional, 5–10, light-colored hairs 1 mm long and occasional, 10–15, glands 0.3 mm long, almost without stellate hairs. Flowering June.

Caucasus: Eastern Transcaucasia, Shémakha District near village of Chagon, along slopes of mountain gorges, 750–1000 m, collected on June 24, 1941. Type in Baku.

Note. It is distinguished from *H. amnoon* N.P. by a short acladium, somewhat thick stolons with quite large leaves, clustered at tips in rosettes; involucre bracts obtuse; peduncles with sparse glands.

534. **H. volhynicum** N.P. Hier. Mitteleur. I (1885) 579; Zahn, Hier. fl. Mosquens. 40; Pflzr. IV, 280, 1423; Asch. and Graebn. Synopsis, XII, I, 329.—*H. bauhini* Bess. (in sched.) Prim. fl. Galic. II (1809) 149, ex. p.

Perennial. Stem 40–50 cm high, slender, glabrous; stolons long, slender, moderately covered with bristles 1.0–1.5 mm long, small-leaved. Basal leaves linear-lanceolate, acute, glaucous, glabrous, with sparse, bristles 2.0–2.5 mm long along margin toward base; cauline leaves 3 (coefficient of leafiness 0.07), linear, acute. Inflorescence paniculate, more or less compact, with up to 40 capitula; floral bracts whitish; peduncles with scattered dark hairs 1–2 mm long, and occasional glands, weakly stellate-hairy, decreasing downward. Involucres 6 mm long, cylindrical; involucre bracts somewhat broad, subacute, blackish, with light-colored border, with dark gray hairs, 1.0–1.5 mm long in moderate number, with occasional glands, almost without stellate hairs. Stigmas yellow. Flowering June to July.

Dry places and forest edges.—*European Part*: Upper Volga, Upper Dniester. *General distribution*: Central Europe. Described from Volyn. Type in Munich.

535. **H. marginale** N.P. Hier. Mitteleur. I (1885) 580; Zahn, Hier. fl. 471 Mosquens. 39; Pflzr. IV, 280, 1423; Asch. and Graebn. Synopsis, XII, I, 329.—*Exs.*: GRF No. 2211; Zahn, Hier. Europ. No. 430a.

Perennial. Stem (20–)40–80 cm high, 1.0–2.5 mm in diameter, without or with occasional bristles 2–3 mm long, eglandular, quite sparsely stellate-hairy; stolons quite long, slender, moderately covered with bristles 1–2 mm long, small-leaved. Outer basal leaves spatulate, round, inner narrowly lanceolate to subacute, glaucous, with sparse to

scattered bristles 2–3 mm long mostly only along margin and along midrib toward base, with sparse to scattered bristles 2–3 mm long, stellate hairs along midrib beneath; cauline leaves (2–)3–4 (coefficient of leafiness 0.07). Inflorescence cymose, more or less compact, with 4–25(–40) capitula; floral bracts dark, with whitish border; peduncles without or with occasional simple hairs 2–3 mm long, almost eglandular, sparsely stellate-hairy. Involucre 5.0–5.5(–6.0) mm long, cylindrical; involucre bracts narrow, acute, dark gray, white-bordered, with occasional light-colored bristles 1.0–1.5 mm long, almost eglandular or with occasional glands and with quite sparse stellate hairs. Corollas light yellow. Stigmas yellow. Flowering June to July.

Dry grassy slopes, sandy dry meadows.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Volga, Upper Dniester, Crimea; *Caucasus*: Dagestan, Eastern Transcaucasia (former Artvin District?), Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Hungary? Type in Munich.

536. *H. pseudauriculoides* N.P. Hier. Mitteleur. I (1885) 577; Zahn in Pflzr. IV, 280, 1422; Asch. and Graebn. Synopsis, XII, I, 328.—*H. pannonicum* ssp. *xystrophyllum* β . *syntomum* Peter in Nachr.-Ges. Wiss. Götting. I (1898) 22.—*Exs.*: Callier. Fl. Siles. exs. No. 855.

Perennial. Stem 50–60 cm high, slender, at base with sparse bristles 1–2 mm long, above glabrous and eglandular, almost without stellate hairs; stolons very long, slender, moderately covered with hairs 1 mm long, small-leaved; leaves of stolons sparsely stellate-hairy on both sides. Outer basal leaves oblong, obtuse, inner ones lanceolate, acute, glaucous, almost glabrous above or young (inner) leaves with scattered bristles 2–3 mm long, along margin with sparse simple hairs 1.0–1.5 mm long, stellate hairs sparse beneath, but on young leaves also above; cauline leaves 2 (coefficient of leafiness 0.03). Inflorescence openly paniculate, with 30–50 capitula; floral bracts dark; peduncles slender, with sparse to scattered pubescence, almost eglandular, with scattered stellate hairs. Involucre 6 mm long, cylindrical; involucre bracts narrow, acuminate, gray-green, with light-colored border, sparse to scattered pubescence with light-colored hairs 1 mm long, with occasional glands, almost without stellate hairs. Stigmas yellow. Flowering June to July.

Woods, dry meadows, in middle montane zone, 500 to 1550 m.—*European Part*: Upper Dniester, Crimea; *Caucasus*: Western Transcaucasia (?). *General distribution*: Central Europe, Balkans-Asia Minor. Described from vicinity of Vienna. Type in Munich.

472 **Note.** The specimens distributed by GRF (Nos. 2055 and 2063) under the name *H. pseudauriculoides* N.P. did not conform at all to the

description of the species (without stolons, leaves without stellate hairs, peduncles and involucre bracts glabrous, etc.). Hence, the occurrence of this species in the Caucasus is doubtful.

Subsection 3. *Praealtoechinina* Juxip.—In habit, plants resemble species of subsections *Florentina* or *Bauhinia* and link them with members of section *Echinina*. Without stolons, but then almost always with collateral stems or runners or long slender stolons of *Bauhinia* type; distinguished from foregoing ones by mostly distinct stellate hairs on all parts and stiff setaceous hairs; leaves mostly yellowish-green or light green, somewhat glaucescent, but very rarely glaucous; inflorescence openly paniculate-umbellate and mostly with many capitula, less often highly dichotomous with fewer capitula; glands on inflorescence (involucre bracts and peduncles) occasional to barely scattered but hairs, on the contrary, scattered to sparse; mostly xerophytes.

1. Inflorescence paniculate or umbellate, mostly with many capitula.....2.
- + Inflorescence deeply or shallowly forked, with few capitula....43.
2. Plants without stolons, but often with collateral stems and runners.....3.
- + Plants with above-ground or underground stolons.....13.
3. Inflorescence (involucre bracts, peduncles) with dense to scattered glands.....4.
- + Inflorescence sparsely glandular or eglandular.....7.
4. Inflorescence densely glandular, glabrous or with very sparse (occasional) hairs; basal leaves usually withering before anthesis.....5.
- + Involucre bracts with up to scattered glands.....6.
5. Cauline leaves (3–5) with narrowed base. Involucres 6–7 mm long; involucre bracts scarcely bordered. Floral bracts dark. Leaves without stellate hairs above, more or less densely hairy (grayish) beneath.....537. **H. wolgensae** Zahn
- + Cauline leaves (4–7) with broad, slightly amplexicaul base, with scattered glands. Involucres 5 mm long; involucre bracts with bright green border. Floral bracts light-colored. Leaves with sparse stellate hairs above (or without hairs), hairs sparse to scattered beneath. Plants of Caucasus.....539. **H. incaniforme** Litw. and Zahn
6. Involucres 6.0–6.5 mm long; peduncles with sparse hairs; cauline leaves 5–7, yellowish-green, on both sides stellate-

- hairy: scattered above, moderate beneath; floral bracts gray. Plants of Caucasus.....550. **H. calodontopsis** Litw. and Zahn
- 473 + Involucres 8.5 mm long; peduncles (almost) glabrous; cauline leaves 3, glaucescent-light green, without stellate hairs above, more or less densely hairy beneath; floral bracts whitish.....551. **H. ochrophyllum** N.P.
- 7 (3). Glands on involucre bracts sparse or occasional.....8.
- + Glands on involucre bracts and peduncles entirely absent; cauline leaves 6.....546. **H. psammophilum** N.P.
8. Coefficient of leafiness 0.20–0.13, i.e., cauline leaves 5–12.....9.
- + Coefficient of leafiness 0.11–0.06, i.e., cauline leaves 3–5(–8); stellate hairs on both sides of leaves; sparse above (often only along midrib), to moderate beneath.....11.
9. Leaves stellate-hairy on both sides: sparsely above, densely beneath; involucre bracts and peduncles (as well as other parts) to densely covered with long bristles. Plants of Caucasus.....544. **H. perasperum** Zahn
- + Leaves without stellate hairs above, sparsely to moderately hairy beneath.....10.
10. Cauline leaves 5–8; involucre bracts with hairs 1–3 mm long. Plants of caucasus.....540. **H. cymirum** Schelk. and Zahn
- + Cauline leaves 8–12; involucre bracts with hairs 0.5–1.0 mm long. Ladoga-Ilmen District.....545. **H. tenuiceps** N.P.
- 11 (8). Hairs on involucre bracts scattered.....12.
- + Hairs on involucre bracts occasional to sparse; peduncles with sparse glands; leaves scattered-hairy; floral bracts gray.....549. **H. calodon** N.P.
12. Glands on peduncles absent; floral bracts dark; leaves glaucescent; acladium very short (3–4 mm long).....547. **H. strictirum** N.P.
- + Glands on peduncles scattered; floral bracts gray; leaves glauscently yellowish-green; acladium 10–12 mm long.....548. **H. multiceps** N.P.
- 13 (2). Cauline leaves along margin and along midrib beneath and basal leaves with fine glands along midrib beneath. Plants endemic to Caucasus.....14.
- + Leaves without fine glands.....16.
14. Cauline leaves 5–10.....15.
- + Cauline leaves 3–5; involucre bracts and peduncles with very dense hairs; leaves sparsely stellate-hairy above, densely beneath.....543. **H. sabiniforme** Zahn
15. Involucre bracts sparsely pubescent, peduncles with scattered pubescence; involucre 5 mm long; stolons slender,

- small-leaved; leaves without stellate hairs above, with sparse (to scattered) hairs beneath.....541. **H. pannoniciforme** Litw. and Zahn
- 474 + Involutral bracts and peduncles with scattered pubescence; involucre 6–7 mm long; stolons somewhat thick, quite large-leaved; leaves without stellate hairs.....542. **H. fominianum** Woron. and Zahn
- 16 (13). Ligules of ray florets red outside. Plants of Caucasus.....17.
- + Ligules of ray florets yellow outside (without red stripes).....18.
17. Coefficient of leafiness more or less high (0.17), i.e., cauline leaves to 10; involucre small (5–6 mm long); glands on involutral bracts scattered, on peduncles sparse.....552. **H. rubropannonicum** Litw. and Zahn
- + Coefficient of leafiness medium (0.07), cauline leaves to 5; involucre medium-sized (7 mm long); involutral bracts more or less eglandular; peduncles eglandular.....553. **H. haematoglossum** Kozl. and Zahn
18. All parts (stem, leaves, peduncles, involutral bracts) more or less conspicuously stellate-hairy (only leaves sometimes without hairs above despite other parts being distinctly stellate-hairy).....19.
- + All parts more or less sparsely or very sparsely stellate-hairy.....36.
19. Coefficient of leafiness more or less high (0.18–0.15), i.e., cauline leaves 5–9.....20.
- + Coefficient of leafiness medium or low.....21.
20. Acladium more or less long (25 mm); peduncles eglandular; involutral bracts moderately, peduncles sparsely to scatteredly hairy; stolons very long.....554. **H. echiogenes** N.P.
- + Acladium of medium length (to 15 mm); peduncles with occasional glands; hairs on involutral bracts and peduncles scattered. Endemic to Crimea.....555. **H. alupkanum** Zahn
21. Coefficient of leafiness medium (0.11–0.06).....22.
- + Coefficient of leafiness low (0.04); cauline leaves 2; involucre more or less large (7.0–7.5 mm long); acladium 8 mm long.....561. **H. arvense** N.P.
22. Involucre more or less large (7–9 mm long).....23.
- + Involucre medium or small.....25.
23. Stem and leaves with somewhat thick, coarse bristles; peduncles slender, with sparse bristles 3.0–3.5 mm long. Endemic to Caucasus.....538. **H. procerigenum** Litw. and Zahn
- + Stem and leaves with thin bristles.....24.

24. Glands on involucre bracts sparse, on peduncles scattered; hairs on involucre bracts scattered; floral bracts light-colored.....556. **H. longisetum** N.P.
 + Glands on involucre bracts and peduncles occasional; simple hairs to dense on involucre bracts and peduncles; floral bracts gray.....557. **H. asperrimum** Schur.
25. Involucres medium, 6–7 mm long.....26.
 + Involucres small, 5.0–6.5 mm long.....33.
26. Acladium short, 5–12 mm long.....27.
 + Acladium longer, 14–35 mm long.....32.
27. Glands on involucre bracts occasional (sometimes entirely absent).....28.
 + Glands on involucre bracts sparse to scattered, on peduncles sparse to occasional; hairs on involucre bracts and peduncles sparse; stolons often undeveloped.....560. **H. latpariense** Peter
28. Peduncles eglandular.....29.
 + Peduncles with occasional glands.....30.
29. Hairs on peduncles to scattered; plants tall (70–85 cm high); cauline leaves 5–9; stem in lower part with bristles 3–4 mm long; stolons somewhat thick.....
558. **H. teberdaefontis** Litw. and Zahn
 + Hairs on peduncles barely sparse; plants 30–40 cm high; cauline leaves 2–3; stem in lower part with bristles 1–2 mm long.....559. **H. semipraecox** Zahn
30. Involucre bracts moderately hairy.....31.
 + Involucre bracts (and peduncles) with occasional to sparse hairs; involucre bracts at base densely white-stellate-hairy.....
563. **H. basileucum** Litw. and Zahn
31. Leaves glaucescent; involucre bracts dark, scarcely bordered; stem in lower part with bristles 3–5 mm long; stolons somewhat thick.....557. **H. asperrimum** (Schur.) N.P.
 + Leaves light green; involucre bracts grayish, with conspicuous light green border; stem in lower part with bristles 5–7 mm long; stolons very thin.....562. **H. lasiophorum** N.P.
- 32 (26). Glands on involucre bracts and peduncles completely absent; involucre bracts acute; hairs on involucre bracts and peduncles scattered to sparse.....564. **H. echiocephalum** N.P.
 + Glands on involucre bracts scattered, sparse on peduncles; involucre bracts obtuse; hairs on involucre bracts scattered to sparse, on peduncles very sparse.....565. **H. mirum** N.P.
- 33 (25). Acladium 12–13 mm long.....34.
 + Acladium 18(10–25) mm long; glands on involucre bracts and peduncles occasional.....569. **H. submirum** Litw. and Zahn

34. Glands on involucre bracts (and peduncles) sparse to occasional; hairs on peduncles sparse.....35.
- 466 + Glands on involucre bracts (and peduncles) scattered or numerous; hairs on involucre bracts scattered, on peduncles almost absent; ligules short.....568. **H. adjarianum** Peter
35. Hairs on involucre bracts to scattered; stem hairs with dark bulb at base.....566. **H. amourobasis** Litw. and Zahn
- + Hairs on involucre bracts to sparse; stem with numerous bristles.....567. **H. sublasiphorum** Litw. and Zahn
- 36 (18). Plants more or less sparsely stellate-hairy; stem mostly hairy only at top; leaves only beneath, peduncles more or less to tomentose; involucre bracts moderately to sparsely hairy.....37.
- + Plants very weakly pubescent; stem and leaves mostly without hairs, peduncles sparsely or densely pubescent but never tomentose; involucre bracts almost without stellate hairs; coefficient of leafiness medium (0.07).....40.
37. Coefficient of leafiness medium (0.11–0.07).....38.
- + Coefficient of leafiness low (0.05); involucre small (5–6 mm long); glands on involucre bracts occasional, on peduncles completely absent; hairs on involucre bracts to scattered.....573. **H. sabiniceps** Litw. and Zahn
38. Involucre medium-sized, 6.5–7.5 mm long.....39.
- + Involucre small, 6 mm long; glands on involucre bracts and peduncles occasional, hairs on involucre bracts sparse to scattered, on peduncles sparse; acladium short (4–5 mm long).....572. **H. thracicum** N.P.
39. Glands on involucre bracts very sparse to occasional, on peduncles occasional or completely absent; hairs on involucre bracts (and peduncles) occasional, 3–4 mm long; cauline leaves 4–6; inflorescence with 15–25 capitula.....570. **H. sarmentosum** Froel.
- + Glands on involucre bracts (and only here) sparse, on peduncles absent; hairs on involucre bracts scattered, on peduncles sparse; cauline leaves 2; inflorescence with 7–8 capitula.....571. **H. pareysianum** N.P.
- 40 (36). Involucre more or less large, 7.0–7.5 mm long; acladium short (8–9 mm long); involucre bracts and peduncles with sparse glands and occasional hairs.....574. **H. umbellosum** N.P.
- + Involucre medium-sized to small.....41.
41. Involucre 6.5–7.0 mm long; acladium 9–12 mm long; glands on involucre bracts and peduncles occasional; hairs on involucre bracts scattered or numerous, on peduncles occasional; floral bracts light-colored.....575. **H. tanythrix** N.P.

- + Involucres small, 4.5–6.0 mm long; acladium longer (15–25 mm long).....42.
- 477 42. Branches of inflorescence significantly longer than acladium; glands on involucre bracts occasional, on peduncles absent; ratio of hairs to glands on involucre bracts 9:1.....576. **H. macroradium** Zahn
- + Branches of inflorescence more or less as long as acladium (inflorescence corymbose); glands on involucre bracts and peduncles sparse; ratio of hairs to glands on involucre bracts 6:4.....577. **H. subumbelliforme** Zahn
- 43 (1). All leaves lanceolate to narrowly lanceolate.....44.
- + Outer basal leaves oblong or elliptical, obtuse; involucres 7 mm long; ray florets purple outside.....578. **H. kolenatti** N.P.
44. Ray florets red outside; involucres 8.0–8.5 mm long; leaves glaucescent.....579. **H. longum** N.P.
- + Ray florets not red but yellow outside (one-colored); involucres 6.0–7.5 mm long; leaves yellowish-green, not glaucescent580. **H. leptophytomorphum** Litw. and Zahn

Cycle 1. Wolgensia Juxip.—*H. wolgensae* Zahn in Schedis ad HFR VI (1908) 93.—In habit, resembling species of cycle *Calodontes*, but with fewer stellate hairs and more glands. Without stolons.

537. **H. wolgensae** Zahn in Sched. HFR VI (1908) 93; Pflzr. IV, 280, 1514.—*H. calodon-floribundum* (vel *echioides* < *floribundum*) Zahn in Pflzr. I. c.—**Exs.:** GRF No. 1846; Zahn, Hier. Europ. No. 335.

Perennial. Stem 60–90 cm high, 1.5–2.0(–5.0) mm in diameter, somewhat flexuous, at base with scattered, setaceous hairs 2.0–3.5 mm long, above sparsely hairy, with scattered glands, thinning downward, conspicuously stellate-hairy. Basal leaves 2–4, outer spatulate-lanceolate, obtuse, usually withering before anthesis, other leaves lanceolate or narrowly lanceolate (15:1), acute, glaucescently yellow-green, more or less sparsely pubescent on both sides, without stellate hairs above, sparsely pubescent beneath; cauline leaves 3–5 (coefficient of leafiness 0.08), with occasional glands at top. Inflorescence openly umbellate-paniculate, with 15–25(–50) capitula; acladium 10–15 mm long; peduncles almost without simple hairs, to sparsely glandular, gray-tomentose; floral bracts dark. Involucres 6–7 mm long, cylindrical; involucre bracts somewhat narrow, subacute, dark, with scarcely a border, with occasional, 3(2–5), hairs 1 mm long, to sparsely, 16(10–20), glandular, glands 0.5 mm long, grayish-pubescent. Corollas dark yellow. Stigmas yellow. Flowering July to August.

Floodplain meadows.—*European Part*: Upper Volga. Endemic? Described from Staritsa District (Kalinin Region). Type in Leningrad.

Cycle 2. Procerigena Juxip.—*H. procerigenum* Litw. and Zahn in Fedde, Repert. III (1907) 192 and *H. bauhiniprocerum* Zahn, l. c. and 478 in Pflzr. IV, 280 (1923) 1528; Grossh. Fl. Kavk. IV, 279.—Resembling *Pannonica* but more robust plants, with scattered thickish bristles throughout.

538. **H. procerigenum** Litw. and Zahn in Sched. HFR XLII (1910) 3; Pflzr. IV, 280, 1528.—**Exs.**: GRF No. 2056.

Perennial. Stem 65–85 cm high, 1.5–4.0 mm in diameter, at base densely, above moderately covered with upwardly spreading bristles 4–6(–10) mm long or with hairs becoming sparse upward (f. *calvescens* Zahn), eglandular, with moderate to sparse stellate hairs; stolons thin or somewhat thick, to 40 cm long and at tips with undeveloped inflorescence or stolons poorly developed to undeveloped, densely setose. Basal leaves to 8, lanceolate, attenuate toward base, long (to 25 cm, 10:1), partly withering before anthesis, yellowish-green, on both sides moderately to sparsely covered with rough bristles 3–4(–7) mm long, without stellate hairs above, very sparse beneath; cauline leaves 4–7(–9) (coefficient of leafiness 0.09), remote, lanceolate, gradually reduced in size. Inflorescence openly umbellate-paniculate, with 20–40 capitula; acladium 3–15 mm long; peduncles slender, with sparse bristles 3–4(–8) mm long, and with occasional glands or completely eglandular, gray-tomentose. Involucres (6.5–)7.0–8.0 mm long, cylindrical-ovate; involucre bracts somewhat narrow and subacute, dark (outer bracts slightly bordered), with sparse to scattered, 25(20–40), or to sparse, 15(10–20) (f. *calvescens* Zahn), white, bristles 4–7 mm long, almost without glands (0–6), 0.2–0.3 mm long, moderately stellate-hairy. Corollas light yellow. Stigmas yellow. Flowering June to July.

Grassy slopes, in middle montane zone.—*Caucasus*: Ciscaucasia, Eastern and Southern Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern Anatolia), Armenia-Kurdistan, Iran. Described from Beshtau. Type in Leningrad.

Note. According to Zahn (in *Sched.* l. c.), it is an intermediate species between *H. bauhini* Schult. and *H. procerum* Fr.

Cycle 3. Incaniformia Juxip.—*H. incaniforme* Litw. and Zahn in Fedde, Repert. III (1907) 193, sub *H. bauhinii* < *incanum* Zahn, l. c.; Pflzr. IV, 280 (1923) 1529.—*H. bauhini* < *verruculatum* Zahn in Pflzr. l. c.—*H. incaniforme* Litw. and Zahn, in Grossh. Fl. Kavk. IV (1934) 280.—Almost always without stolons; cauline leaves 4–7, sessile, with

broad, slightly amplexicaul base, scattered glands; involucre 5 mm long; involucre bracts as well as peduncles densely glandular. Plants of Caucasus, Asia Minor and Iran.

539. **H. incaniforme** Litw. and Zahn, in Vestn. Tifl. Bot. Sada, 22 (1912) 25; Pflzr. IV, 280, 1530.—Exs.: Woronow, Pl. Cauc. No. 5561.

479 Perennial. Stem 75–90 cm high, 1–2 mm in diameter, at base densely covered with bristles 1.0–1.5(–2.0) mm long, above more or less glabrous and with sparse glands thinning to middle of stem, more or less conspicuously stellate-hairy; stolons almost always absent. Outer basal leaves spatulate, obtuse, always withering before anthesis, inner lanceolate to narrowly lanceolate, to 20 cm long, to acute, green or glaucescent, partly withering before anthesis, with occasional to scattered, short hairs 1.0–1.5(–2.0) mm long above, sparse beneath and along margin, to dense along midrib beneath, without or with very sparse stellate hairs above, sparse to scattered beneath; cauline leaves 4–7 (coefficient of leafiness 0.07), sessile, with broad, slightly amplexicaul base, often small to bracteiform, with scattered glands. Inflorescence openly umbellate-paniculate, with 15–35 capitula; acladium 5–12 mm long; peduncles mostly almost without simple hairs, but densely glandular, gray-tomentose; floral bracts light-colored. Involucres 5 mm long, ovate-cylindrical; involucre bracts narrow, subacute, dark green, with bright green border, with very sparse simple hairs 1.0–1.5 mm long, or without (f. *epilosiceps* Zahn), densely glandular (glands quite large), with sparse but at base scattered stellate hairs. Corollas yellow. Stigmas yellow. Flowering June to August.

Forest edges, in middle montane zone.—*Caucasus*; Eastern and Western Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern Anatolia), Armenia-Kurdistan, Iran. Described from Teberda (Kuban Region). Type unknown.

Note. *H. subincaniforme* Kozl. and Zahn (Vestn. Tifl. Bot. Sada, 29, 9; Pflzr. IV, 280, 1530) is very close to this species. It is distinguished by longer bristles at the base of the stem and on the leaves. It was found in Eastern Transcaucasia (Bakuriani). Type unknown.

Cycle 4. Pannoniciformia Juxip.—*H. pannoniciforme* Litw. and Zahn in Fedde, Repert. III (1907) 191; sub *H. auriculoides* > *incanum*; Sched. HFR XLII (1910) 14, sub *H. incanum* < *pannonicum*; sub *auriculoides* > *verruculatum* Zahn in Pflzr. IV, 280 (1923) 1530.—In habit, the species of this cycle resemble those of *Pannonica* but are distinguished by large number of cauline leaves, quite often with tiny occasional glands, and basal leaves with fine glands beneath along midrib. Endemic plants of Caucasus.

540. **H. cymiratum** Schelk. and Zahn in Izv. Kavk. Muzeya, VII (1912) 134; Pflzr. IV, 280, 1530.

Perennial. Stem 45–60 cm high, 1.5–2.0(–4.0) mm in diameter, at base very densely covered with bristles 2–4 mm long, thinning and shortening upward, scarcely with solitary glands, densely stellate-hairy; stolons usually absent or runner-like, ascending. Basal leaves 480 1–6, oblong-lanceolate, obtuse or narrow, acute, with quite dense bristles 3–4 mm long, sparsely or moderately stellate-hairy beneath; cauline leaves 5–8 (coefficient of leafiness 0.13). Inflorescence umbellate-paniculate, with 8–20(–45) capitula, peduncles with sparse to scattered hairs 1–4 mm long, scarcely (to occasionally) fine-glandular, white-tomentose. Involucres 6.0–7.5 mm long; involucre bracts with scattered (25–30) hairs with occasional (6–8) glands 0.2–0.4 mm long, gray-green from sparse hairs. Flowering June to July.

Middle montane zone, at 2100–2400 m.—*Caucasus*: Eastern and Western Transcaucasia, Talysh. Endemic. Described from Svanetia. Type in Tbilisi.

541. **H. pannoniciforme** Litw. and Zahn in Fedde, Repert. III. (1907) 191; Sched. HFR XLII., 14; Pflzr. IV, 280, 1530.—*Exs.*: GRF No. 2080 p. p.

Perennial. Stem 55–100 cm high, 1.5–3.0 mm in diameter, moderately covered with bristles 2–3 mm long, almost eglandular, stellate-hairy throughout; stolons quite long and slender, quite densely pubescent, often undeveloped or runner-like, with small leaves, somewhat larger toward base. Basal leaves 4–9, lanceolate, outer (ones) short, subobtus, mostly withering, inner narrow, long, to 20 cm long (10–16:1), on both sides covered with scattered bristles 2.0–2.5 mm long, as a whole to moderately hairy, without or with quite sparse stellate hairs above, sparse to scattered beneath; cauline leaves 5–10 (coefficient of leafiness 0.10), sessile, with broad base, yellow-green or glaucescent, 3–4 upper leaves small, very often with occasional, fine glands (visible under high magnification), lower leaves glandular along midrib beneath. Inflorescence umbellate-paniculate, with 15–40 capitula; acladium 3–12 mm long; peduncles with scattered hairs 2–3 mm long (or almost glabrous), sparsely glandular or eglandular (f. *subeglandulosum* Zahn), gray-tomentose; floral bracts grayish. Involucres 5–6 mm long, cylindrical-ovate; involucre bracts somewhat narrow, subacute, dark gray, with bright green border, with sparse (20–25) light-colored hairs with dark base 1.5–2.0 mm long, with fine glands 0.3–0.4 mm long, glands sparse (10–16) to occasional (4–10) (f. *subeglandulosum* Zahn), with scattered stellate hairs, margin glabrous. Stigmas yellow. Flowering June to July.

Meadows and forest edges in middle montane zone.—*Caucasus*: Eastern and Western Transcaucasia. Endemic. Described from Teberda. Type in Leningrad (?).

Note. The material distributed by GRF (No. 2080) apparently is not uniform throughout; at least in the specimen studied by us, no glands were found on the cauline leaves, and hence the plant was not distinguishable from the members of cycle *Pannonica*.

542. **H. fominianum** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 12 (1908) 16; Pflzr. IV, 280, 1531.

481 Perennial. Stem 75 cm high, thick, with erect bristles 3–5 mm long, dense at base to scattered upward, with occasional glands and scattered stellate hairs down to base; stolons long, somewhat thick, with quite large leaves. Basal leaves lanceolate, to 20 cm long, to acute, somewhat glaucescent, on both sides with sparse bristles 2–5 mm long, with small, occasional glands along margin and beneath along midrib, without stellate hairs (or young leaves sparsely stellate-hairy beneath); cauline leaves to 10 (coefficient of leafiness 0.13), narrowly lanceolate, sessile, with broad base, glandular along margin, upper leaves stellate-hairy beneath. Inflorescence umbellate-paniculate with up to 100 capitula; acladium 15 mm long; peduncles with sparse hairs 1–3 mm long, with scattered glands, grayish from hairs. Involucres 6–7 mm long, ovate-cylindrical; involucral bracts somewhat broad, subacute, dark, with green border, with scattered hairs 1–2 mm long and quite large scattered glands, mostly somewhat stellate-hairy at base. Flowering June to July.

Caucasus: Eastern Transcaucasia. Endemic. Described from Mashhad. Type unknown.

Note. Close to this species are two species, namely, *H. variegaticeps* Woron. and Zahn (*Vestn. Tifl. Bot. Sada*, 22, 25; *Pflzr.* IV, 280, 1531) and *H. samscharicum* Woron. and Zahn (l. c.), described from the former Artvin District (eastern Anatolia), that could possibly be found in Western or Southern Transcaucasia. Both species are distinguished by fewer cauline leaves (3–5). Besides, *H. variegaticeps* is distinguished by sparsely glandular peduncles and *H. samscharicum* by leaves that are sparsely stellate-hairy beneath. Type unknown.

543. **H. sabiniforme** Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 8; Pflzr. IV, 280, 1531.

Perennial. Stem 60 cm high, scatteredly to sparsely covered with bristles 2–3 mm long, sparsely glandular, somewhat stellate-pubescent. Basal leaves oblong-lanceolate, obtuse to subacute, with rather dense bristles 3–4 mm long, sparsely stellate-pubescent above, densely

so beneath; cauline leaves 3–4 (coefficient of leafiness 0.07), quite remote, small, all leaves with occasional fine glands. Inflorescence openly umbellate, with up to 50 capitula; peduncles rather densely pubescent, sparsely glandular, gray from hairs. Involucres 6 mm long; involucre bracts rather densely pubescent (hairs with black base), with sparse glands, densely stellate-pubescent. Flowering June to July.

Middle montane zone, to 2,000 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Abkhazia. Type unknown.

Cycle 5. Calodontia Juxip.—*H. calodon* Tausch apud N.P. Hier. Mitteleur. I (1885) 742, 840, and *H. florentinum-echioides* N.P. Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. (1910) 1094; Zahn, Hier. fl. Mosquens. 52; Pflzr. IV, 280, 1510.—*H. piloselloides-echioides* Zahn 482 in Hegi, Ill. Fl. VI, 2, (1929) 1238; Asch. and Graebn. Synopsis, XII, I (1930) 469.—*H. collinum* β . *dentatum* Tausch in Flora, XI (1828) Erg.-Bl. I, 58.—*H. sarmentosum* β . *apterum* Froel. in DC. Prodr. VII (1838) 202.—*H. praealtum* ϵ . *hirsutum* Koch, Synopsis, 2, II (1844) 513, p. p.—Stem 30–90 cm high, flexuous, without stolons but often with collateral stems and runners; leaves lanceolate, more or less glaucescent, with stellate pubescence on both sides, cauline leaves 3–10. Inflorescence openly umbellate-paniculate, with 10–30(–40) capitula; involucres 6–8(–9) mm long; involucre bracts mostly narrow and acute; pubescence of plants from abundant to sparse; glands sparse, stellate pubescence appreciable; stigmas yellow. Distributed within the areas of cycles *Echinina* and *Florentina*, this cycle is considered intermediate (hybrid?) between these cycles. Often under this name in herbaria, specimens of *H. auriculoides* Lang coll. can also be found which were poorly collected or lack stolons because of suppressed growth. This particularly relates to *Calodontia*, collected in Crimea and the Caucasus. Members of cycles *Florentina* and *Bauhinia*, as well as of their derivatives *Calodontia* and *Pennonia*, can be distinguished from each other only by the presence or absence of stolons.

544. *H. perasperum* Zahn in Izv. Kavk. Muzeya, VII (1912) 132; Pflzr. IV, 280, 1512.

Perennial. Stem to 65 cm high, 3–4 mm in diameter, rather densely setose with long (4 mm) bristles, eglandular, densely stellate-pubescent, without stolons. Basal leaves 1–3, narrowly lanceolate, very long (to 26 cm, 16:1), densely pubescent, with scattered stellate pubescence above, densely stellate-hairy beneath; cauline leaves 9–12 (coefficient of leafiness 0.15). Inflorescence umbellate-paniculate, with (15–)30–50 capitula; acladium 8–10 mm long; peduncles rather densely pubescent, eglandular, gray-tomentose; floral bracts grayish. Involucres 6–7 mm

long; involucre bracts narrow, acute, with scattered, 25(20–35), hairs 3 mm long, with scarce, 4(1–7), glands 0.3 mm long, densely stellate-pubescent. Ligules short; stigmas yellow. Flowering June to July.

Caucasus: Dagestan. Endemic. Described from Dagestan (Chir-Yurt). Type in Tbilisi.

Note. Zahn hypothesized that this species may be intermediate between *H. echiioides* and the non-stoloniferous specimens of *H. bauhini*, which is quite probable (see note to cycle *Calodontia*).

545. *H. tenuiceps* N.P. Hier. Mitteleur. I (1885) 746; Zahn in Pflzr. IV, 280, 1511; Asch. and Graebn. Synopsis, XII, I, 471.—**Exs.**: GRF No. 1260.

483 Perennial. Stem 30–90 cm high, 1–3 mm in diameter, with scattered bristles 1.0–2.5 mm long in lower part decreasing upward, eglandular, moderately stellate-pubescent. Basal leaves 3–7, narrowly spatulate or linear-lanceolate, subobtuse to acute, to 13 cm long (8–12:1), glaucescent, with moderate but beneath along midrib dense hairs 2–4 mm long, stellate pubescence mostly only beneath; cauline leaves (4–)8–12 (coefficient of leafiness 0.13), evenly distributed. Inflorescence openly umbellate, with 10–60 capitula; acladium 10 mm long; peduncles with sparse hairs 1.0–1.5 mm long, eglandular or with occasional glands, grayish; floral bracts dark. Involucre 6–7 mm long, cylindrical-ovate; involucre bracts narrow, acute, dark, with indistinct border, with scattered, 23(15–30), light-colored hairs 0.5–1.5 mm long and with occasional (0–5) small glands, densely stellate-pubescent; plants resembling *H. echiioides*. Flowering June to July.

Heaths, edges of pine forests, on sands.—*European Part*: Baltic Region, Ladoga-IImen. *General distribution*: Central Europe. Described from Prussia. Type in Munich.

546. *H. psammophilum* N.P. Hier. Mitteleur. I (1885) 745; Zahn in Pflzr. IV, 280, 1511; Asch. and Graebn. Synopsis, XII, I, 470.—**Exs.**: Callier, Iter. Taur. tert. No. 668.

Perennial. Stem (25–)45–50 cm high, 1.0–1.5 mm in diameter, rather densely setose in lower part with upturned bristles 1.5–2.5 mm long, moderately hairy higher up with erect hairs, eglandular, stellate-pubescent throughout, densely so at top. Basal leaves lanceolate or narrow lanceolate, acute, to 6 cm long (11:1), glaucescent, with sparse bristles 2.0–2.5 mm long above, moderately stellate-pubescent on both sides or only beneath; cauline leaves 4–6 (coefficient of leafiness 0.12), spread over entire stem. Inflorescence very open umbel, with (5–)15–30 capitula; acladium 5–12 mm long, rays [branches] longer than acladium;

peduncles with occasional, light-colored hairs 1.0–1.5 mm long, eglandular, gray-tomentose, floral bracts dark. Involucres 7 mm long, cylindrical; involucre bracts very narrow, acute, gray, with indistinct light-colored border and sparse, 16(14–20), light-colored hairs 0.5–1.0(–2.0) mm long, eglandular, gray from stellate pubescence. Corollas dark yellow; stigmas yellow. Flowering June to July.

On sands.—*European Part*: Ladoga-Ilmen, Crimea. *General distribution*: Central Europe, Balkans-Asia Minor (western part). Described from Prussia. Type in Munich.

547. **H. strictiramus** N.P. Hier. Mitteleur. I (1885) 746; Zahn, Hier. fl. Mosquens. 53; Pflzr. IV, 280, 1511; Asch. and Graebn. Synopsis, XII, I, 471.

Perennial. Stem 35–65 cm high, 1.0–1.5 mm in diameter, flexuous, in lower part moderately to scatteredly pubescent with upright bristles 2 mm long or throughout with short bristles 1 mm long (f. *kolomnense* Zahn). Basal leaves narrowly lanceolate, acute, glaucescent, moderately setose on both sides with bristles 1.5–2.5 mm long, sparsely stellate-pubescent above, rather densely so beneath; cauline leaves 4–
484 5(–8) (coefficient of leafiness 0.11). Inflorescence very openly umbellate, with 10–18(–30) capitula; acladium short, 3–4 mm long; peduncles sparsely hairy, almost eglandular, gray-tomentose; floral bracts dark. Involucres 7–8 mm long, ovate; involucre bracts narrow, acute, gray, with indistinct border and with scattered, light-colored hairs 1 mm long, sparsely glandular, gray from stellate pubescence. Flowering June to July.

On sands.—*European Part*: Baltic Region, Upper Volga. Endemic? Described from Riga. Type in Munich.

548. **H. multiceps** N.P. Hier. Mitteleur. I (1885) 744; Zahn, Hier. fl. Mosquens. 53; Pflzr. IV, 280, 1512; Asch. and Graebn. Synopsis, XII, I (1930) 471.

Perennial. Stem 65 cm high, 1.5–2.0 mm in diameter, moderately setose below, sparsely above, bristles 2–3 mm long, to middle of stem sparsely glandular, moderately stellate-pubescent. Outer basal leaves oblong, obtuse, inner lanceolate, acute, glaucescent-yellowish-green, rather densely hairy on both sides, hairs 1–2 mm long, sparsely stellate-pubescent above, scatteredly so beneath; cauline leaves 4 (coefficient of leafiness 0.06), with occasional glands at tip. Inflorescence almost umbellate, open, with its branches much exceeding acladium, 10–12 mm long, with 30 capitula; peduncles scatteredly to sparsely pubescent, with scattered glands, densely pubescent[sic.], floral bracts grayish. Involucres 7.0–7.5 mm long, ovate-cylindrical; involucre bracts

somewhat broad, acute, dark, with indistinct border and scattered hairs 1.5 mm long, with occasional glands, scatteredly stellate-pubescent but moderately so at base. Corollas dark yellow. Flowering June to July.

Dry meadows.—*European Part*: Upper Volga. *General distribution*: Central Europe. Described from Hungary. Type in Munich.

549. **H. calodon** N.P. Hier. Mitteleur. I (1885) 744; Zahn in Pflzr. IV, 280, 1512; Asch. and Graebn. Synopsis, XII, I, 472.—**lc.**: Syreistsch. Fl. Mosk. Gub. III (1910) 362.—**Exs.**: GRF No. 1258.

Perennial. Stem 30–90 cm high, 2 mm in diameter, at base with scattered to moderate (or even dense) hairs 1.5–4.0 mm long, above with sparse glands, with occasional glands reaching almost to base, rather densely stellate-pubescent. Basal leaves 2–9, lanceolate to narrowly lanceolate (8–11.5:1), mostly acute, glaucescent, with scattered bristles 2.0–3.0 mm long above, as a whole scatteredly pubescent, occasionally or sparsely (mostly along midrib only) stellate-pubescent above, but to rather densely so beneath; cauline leaves 3–5(–8) (coefficient of leafiness 0.10), rather densely stellate-pubescent on both sides. Inflorescence openly umbellate-paniculate, with 5–20(–40) capitula; acladium 6–8 mm long; peduncles with occasional or sparse, 485 dark hairs 1–2 mm long and to sparsely glandular, gray-tomentose; floral bracts gray. Involucres (5–)6–7(–8) mm long, cylindrical, involucral bracts very narrow, acute, dark gray, almost without border, with occasional to sparse (6–30) hairs 1.5 mm long, and also sparse (4–25) glands 0.4 mm long, densely stellate-pubescent (grayish) to margins. Corollas light yellow; stigmas yellow. Flowering June to July.

Sands, heaths, dry meadows, and mountain slopes.—*European Part*: Baltic Region (southern part), Ladoga-IImen, Upper Volga; *Caucasus*: Eastern and Western Transcaucasia, Talysh. *General distribution*: Central Europe (eastern part). Described from vicinity of Prague. Type in Munich.

Note. Besides the typical form described here, we also find forms that are much more hairy, representing a transition to *H. sphaleron* N.P. (*Hier. Mitteleur.* I, 745; *Pflzr.* IV, 280, 1512; Asch. and Graebn. *Synopsis*, XII, I, 472). Zahn (*Pflzr.* l. c.) reports the latter species for the Caucasus (former Artvin District); thus, this species could be found within our borders in Transcaucasia. As the presence of this species in this region is doubtful, pending confirmation, we have decided not to include *H. sphaleron* N.P. in the composition of our flora.

550. **H. calodontopsis** Litw. and Zahn in Fedde, Repert, III (1907) 193 and in Sched. ad HFR, XLII (1910) 7; *Pflzr.* IV, 280, 1512.—**Exs.**: GRF No. 2065.

Perennial. Stem up to 75 cm high, 2 mm in diameter with hairs moderate at base, scattered above, 0.5–1.5 mm long, and occasional glands only above, rather densely stellate-pubescent. Basal leaves 2–5, narrowly lanceolate, acute, to 15 cm long (10–14:1), yellowish-green, with scattered bristles 0.5–1.0 mm long on both sides, denser bristles 0.5–1.0 mm long along margin, as a whole pubescence to scattered, scatteredly stellate-pubescent above, moderately so beneath; cauline leaves 4–5(–7) (coefficient of leafiness 0.09), mostly in lower half of stem, upper leaves very acuminate. Inflorescence openly paniculate, with 15–40 capitula; acladium 12 mm long; peduncles with sparse hairs 0.5–1.0 mm long and occasional glands, gray-tomentose; floral bracts gray. Involucres 6.0–6.5 mm long, cylindrical; involucre bracts narrow, acute, dark gray, with green border and sparse, 14(10–20), light-colored hairs 0.5–1.0 mm long having black base, and with almost scattered, 24(20–27), fine glands 0.3–0.5 mm long, stellate pubescence of involucre bracts moderate, at base dense; stigmas yellow. Flowering June.

Forest meadows in middle montane zone.—*Caucasus*: Ciscaucasia. Endemic. Described from Teberda. Type in Leningrad.

551. ***H. ochrophyllum*** N.P. Hier. Mitteleur. I (1885) 745; Zahn in Pflzr. IV, 280, 1513; Asch. and Graebn. Synopsis, XII, I, 472.—Exs.: GRF No. 1259a, b.

486 Perennial. Stem 25–50 cm high, 1.0–2.0 mm in diameter, flexuous, ascending, with scattered, dark bristles 1–2 mm long and occasional glands, grayish from pubescence. Basal leaves 4–6, mostly lanceolate, acute, to 9 cm long (8–14:1), glaucescently light green, with scattered, bristles 2.0–3.5 mm long above and almost without stellate hairs, more or less densely pubescent beneath; cauline leaves 3–5 (coefficient of leafiness 0.10). Inflorescence openly paniculate, with 8–30 capitula; acladium to 10 mm long, peduncles almost without hairs, very sparsely glandular, gray-tomentose; floral bracts white. Involucres 5.5–7.0 mm long, ovate-cylindrical; involucre bracts somewhat broad and sub-acute, gray, almost without border, with occasional, 8(6–16), dark hairs 0.5–1.0 mm long, sparsely, 11(5–27), glandular, glands 0.3 mm long, gray from pubescence. Flowering June to July.

Slopes, heaths, pine forest edges.—*European Part*: Ladoga-Ilmen (southern part). *General distribution*: Central Europe. Described from Central Europe. Type in Munich.

Note. Apparently, *H. pskowiense* Zahn (in *Sched. HFR*, V, No. 1268; Pflzr. IV, 280, 1515) should be included here. It is distinguished by somewhat dark floral bracts, frequent red stripes on the outer side of the corolla and abundant to scattered glands on the inflorescence.

Cycle 6. Pannonica Juxip.—*H. auriculoides* Lang in Syllab. pl. nov. Soc. Ratisb. I (1824) 183; Kerner in Öster. Bot. Zeitschr. (1872) 257; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1095; Pflzr. IV, 280, 1515; Asch. and Graebn. Synopsis, XII, I, 475; Grossh. Fl. Kavk. IV, 279.—*H. sarmentosum* Froel. in DC. Prodr. VII (1838) 202; Boiss. Fl. or. III, 862, pro synon.—*H. praealtum* v. *hispidissimum* Fr. Epicr. (1862) 31 p. p.; Boiss. Fl. or. (l. c.).—*H. pannonicum* (= *H. magyricum-echioides*) N.P. Hier. Mitteleur. I (1885) 749, 841.—*H. bauhini-echioides* Zahn in Koch, Synopsis. 3, II (1901) 1756; Pflzr. op. cit. and in Asch. and Graebn. Synopsis (l. c.).—In habit greatly resembling members of subsection *Bauhinia* with very long, thin stolons (not developing when growth suppressed), and small or more or less conspicuous, remote leaves, but distinguished by more or less dense, long, more or less setose pubescence and mostly dense stellate pubescence but sparse glands. Leaves mostly lanceolate, long, glaucescent, with stellate pubescence on both sides or only beneath, or (as an exception) completely without pubescence; cauline leaves (2–)3–10; inflorescence mostly umbellate-paniculate, with (7–)10–40(–50) capitula; involucre (5–)6–7(–9) mm long, cylindrical; corollas and stigmas yellow; in Asia Minor (and Caucasian) forms, corollas often purple on outer side.

In the USSR found mainly in Crimea and the Caucasus, dropping out rapidly northward but reaching Moscow. Highly polymorphic, distinguished mostly by pubescence.

552. *H. rubropannonicum* Litw. and Zahn in Fedde, Repert. III (1907) 186; Pflzr. IV, 280, 1524.

487 Perennial. Stem up to 60 cm high, 1.5–3.0 mm in diameter, with hairs moderate at base, 2.5–5.0 mm long, sparse above, 2.5–3.5 mm long, with occasional glands and densely stellate pubescence above, pubescence thinning downward; stolons elongated, thin, moderately hairy, with medium-sized leaves. Basal leaves lanceolate, to acute, some withering before anthesis, glaucescently light green, on both sides with scattered bristles 3–5 mm long, without stellate pubescence above, but sparsely to scatteredly stellate-hairy beneath; cauline leaves to 10 (coefficient of leafiness 0.17), narrowly lanceolate, upper (4–6) small, gradually passing over to floral bracts. Inflorescence openly paniculate, with 25–50 capitula; acladium 5–12 mm long; peduncles with sparse hairs 2.5 mm long, sparsely glandular, grayish from pubescence. Involucre 5–6 mm long, cylindrical-ovate; involucre bracts somewhat broad, acuminate or subobtusate, dark green, with green border and scattered or sparse, light-colored hairs 1–2 mm long with dark base, scatteredly glandular, stellate hairs at base dense, scattered above, margin glabrous. Corollas yellow but ligules with bright red

stripes on outside (f. *valdestriatum* Zahn) or only teeth red (f. *substriatum* Zahn). Flowering June to July.

Middle montane zone.—*Caucasus*: Ciscaucasia and Eastern Transcaucasia. Endemic. Described from Teberda (Kuban Region). Type unknown.

553. *H. haematoglossum* Kozl. and Zahn in Vestn. Tifl. Bot. Sada, 29 (1913) 6; Pflzr. IV, 280, 1524.

Perennial. Stem to 70 cm high, at base to dense, densely stellate-pubescent, eglandular; stolons thin, long. Basal leaves lanceolate, with scattered bristles 3–4 mm long, densely stellate-pubescent beneath; cauline leaves 5 (coefficient of leafiness 0.07). Inflorescence paniculate, with 25–30 capitula; peduncles with sparse hairs, eglandular, gray from pubescence. Involucres 7 mm long; involucral bracts with sparse hairs with dark base, (almost) eglandular, scattered-pubescent. Ligules bright purple on outside. Flowering June.

Caucasus: Eastern Transcaucasia. Endemic. Described from Bakuriani (Tbilisi). Type unknown.

Note. It differs from the previous species by absence of glands.

554. *H. echiogenes* N.P. Hier. Mitteleur. I (1885) 751; Zahn in Pflzr. IV, 280, 1523; Asch. and Graebn. Synopsis, XII, I, 484.—*H. pestiense* Simk. in Termesz. Fü. II (1878) 31, var. *subechioides* Borb.—*H. subechioides* Borb. Budapest Körny, növ. (1879) 95.

488 Perennial. Stem 30–50 cm high, 2–3 mm in diameter, with rather dense bristles at base, bristles 2–3 mm long, thinning upward to scattered, eglandular, rather densely stellate-pubescent stolons greatly elongated, thin, stiff small-leaved but often undeveloped or runner-like. Basal leaves 3, linear-lanceolate, acute, glaucescent, on both sides with scattered bristles 2–4 mm long, densely stellate-pubescent along midrib beneath, scatteredly so above, moderately beneath; cauline leaves 5–7 (coefficient of leafiness 0.18). Inflorescence openly umbellate-paniculate, with 10–35 capitula; acladium 25 mm long; peduncles with sparse to scattered hairs, eglandular, gray from stellate pubescence; floral bracts gray. Involucres 6.0–8.5 mm long, cylindrical; involucral bracts narrow, acuminate, gray, with scattered, 31(27–35), light-colored hairs 1–3 mm long and occasional, 0–3, glands 0.1–0.3 mm long, gray from pubescence. Corollas light yellow; stigmas yellow. Flowering June to July.

Dry places, mountains, from 1,260 to 2,300 m.—*European Part*: Crimea; *Caucasus*: Western Transcaucasia, Talysh. *General distribution*: Central Europe (eastern part), Balkans-Asia Minor. Described from vicinity of Vienna. Type in Munich.



555. **H. alupkanum** Zahn in Pflzr. IV, 280 (1923) 1523.

Perennial. Stem 35–50 cm high, with rather dense bristles 3–5 mm long, eglandular, distinctly stellate-pubescent, stolons weakly developed, runner-like. Outer basal leaves oblong-spatulate to lanceolate, moderately setose, very sparsely stellate-pubescent above but to scatteredly so beneath; cauline leaves 5–9 (coefficient of leafiness 0.15). Inflorescence umbellate, with 12–30 capitula; acladium to 15 mm long; peduncles to scattered-pubescent, with occasional small glands at tip, white-tomentose. Involucres (6.5–)7.5–8.5 mm long; involucral bracts somewhat narrow, with sparse, 22(16–26), hairs 3–5 mm long, with occasional (0–3), glands at tips, more or less white-tomentose. According to Zahn, it is a species transitional to *H. asiaticum* N.P. Flowering June to July.

Mountain slopes.—*European Part*: Crimea. Endemic. Described from vicinity of Alupka. Type unknown.

556. **H. longisetum** N.P. Hier. Mitteleur. I (1885) 750; Zahn in Pflzr. IV, 280, 1523; Asch. and Graebn. Synopsis, XII, I, 483.—**Exs.**: Zahn, Hier. Europ. No. 439.

Perennial. Stem 50–60 cm high, 2–3 mm in diameter, with rather dense bristles below, but moderate upward, 4–6 mm long, with occasional glands above, quickly thinning to none, moderately stellate-pubescent; stolons greatly elongated, somewhat thin, densely pubescent. Basal leaves long, lanceolate, acute, glaucescently yellowish-green, with sparse bristles 3–5 mm long above toward margin, scattered bristles along margin and beneath, to densely hairy beneath
491 along midrib, without stellate pubescence above, sparsely pubescent beneath; cauline leaves 4 (coefficient of leafiness 0.08). Inflorescence openly spreading-paniculate, with 12–15 capitula; acladium 12 mm long; peduncles with rather dense hairs, with scattered glands, gray from hairs; floral bracts light-colored. Involucres 8–9 mm long, cylindrical, later almost globose; involucral bracts somewhat broad, acute, dark, with distinct bright border, with scattered, light-colored hairs 1.0–1.5 mm long and sparse, small glands, with scattered stellate pubescence. Corollas light yellow. Flowering June to July.

Sands, dry mountain slopes.—*European Part*: Upper Dniester, Crimea; *Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Austria. Type in Munich.

557. **H. asperrimum** Schur. Enum. Tranass. (1866) 400; N.P. Hier. Mitteleur. I, 752; Zahn in Pflzr. IV, 280, 1523; in Asch. and Graebn.

Synopsis, XII, I, 483.—**Exs.:** Zahn, Hier. Europ. No. 438; Callier, Iter. Taur. III, Nos. 768, 801, p. p.

Perennial. Stem 30–65 cm high, 1.5–2.0 mm in diameter, flexuous, with rather dense bristles 3.5 mm long below, thinning upward, eglandular, moderately stellate-pubescent, stolons elongated; somewhat thickish. Basal leaves 3, narrow, linear-lanceolate, acute (12–14:1), glaucous, on both sides with scattered, stiff bristles 3–5 mm long, to densely setose beneath along midrib, stellate pubescence barely conspicuous only beneath; cauline leaves 4–6 (coefficient of leafiness 0.11). Inflorescence openly umbellate-paniculate, with 10–30 capitula; acladium 10–15 mm long; peduncles rather distinctly pilose, with occasional glands, gray from pubescence; floral bracts gray. Involucres 5.5–8.0 mm long, cylindrical; involucral bracts narrow, acute, dark, with indistinct border, with sparse (20), light-colored hairs 1–2 mm long and occasional (5–7) glands 0.2–0.5 mm long, barely stellate-pubescent. Corollas light yellow; of all the species of *Pannonica*, it is closest to *H. echioides*. Flowering June to July.

Dry places, stony mountain slopes.—*European Part:* Upper Dniester, Crimea; *Caucasus:* Eastern Transcaucasia. *General distribution:* Central Europe. Described from Transylvania. Type in Munich.

558. *H. teberdaefontis* Litw. and Zahn. in Fedde, Repert. IV (1907) 187; Pflzr. IV, 280, 1522.

Perennial. Stem 70–85 cm high, 3–5 mm in diameter, with fairly dense bristles 3–4 mm long in lower part, eglandular, densely stellate-pubescent; stolons very long, thickish, densely covered with hairs 2.5 mm long and with medium-sized leaves. Basal leaves lanceolate, to 18 cm long, scatteredly pubescent, sparsely stellate-pubescent above, conspicuously beneath; cauline leaves 5–8 (coefficient of leafiness 0.09). Inflorescence openly umbellate-paniculate, many-headed; 492 acladium to 12 mm long; peduncles scatteredly pubescent, eglandular, gray-tomentose; floral bracts grayish. Involucres 6–7 mm long; involucral bracts somewhat narrow, with scattered hairs 1–3 mm long and occasional glands only at tips, moderately stellate-pubescent. Flowering June to July.

Subalpine zone, at 2,300 m.—*Caucasus:* Ciscaucasia. Endemic. Described from Teberda. Type unknown.

559. *H. semipraecox* Zahn in Ann. mus. Hung. (1910) 57; Pflzr. IV, 280, 1520; Asch. and Graebn. Synopsis, XII, 480.—*H. praecox* N.P. Hier. Mitteleur. I (1885) 751, non al.—*H. caniramus* Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 24.

Perennial. Stem 30–45 cm high, 1.5–2.0 mm in diameter, flexuous, with rather dense, light-colored bristles 1–2 mm long, eglandular, rather densely stellate-pubescent; stolons greatly elongated, thin. Basal leaves lanceolate to almost linear, subobtuse to acute, glaucescent, on both sides scatteredly pubescent, with bristles 2.0–2.5 mm long above, denser beneath along midrib, without down above, more or less scatteredly stellate-pubescent beneath; cauline leaves 2–3 (coefficient of leafiness 0.07). Inflorescence openly umbellate-paniculate, with 10–30 capitula; acladium 7–8 mm long; peduncles to barely pubescent, eglandular, gray from hairs; floral bracts gray. Involucres 6.0–6.5 mm long, ovate; involucre bracts narrow, acute, dark gray, with light-colored border, with scattered, short hairs 0.5 mm long, eglandular or with occasional glands, rather densely stellate-pubescent. Flowering May to June.

Caucasus: Eastern Transcaucasia, Western Transcaucasia (former Artvin District). *General distribution*: Central Europe, Balkans-Asia Minor. Described from vicinity of Prague. Type in Munich.

560. **H. latpariense** Peter in Nachr. K. Ges. Wiss. Götting. I (1898) 21; Zahn in Pflzr. IV, 280, 1521.

Perennial. Stem 40–65 cm high, with hairs rather dense at base, 3–4 mm long, scattered above, 2–3 mm long, eglandular; stolons often undeveloped. Basal leaves lanceolate, with scattered hairs 3–4 mm long, with dense stellate down beneath; cauline leaves 5–6 (coefficient of leafiness 0.11). Inflorescence umbellate, with 10–25 capitula; acladium 10 mm long, peduncles more or less sparsely pubescent, with sparse to occasional glands, gray from down. Involucres 6–7 mm long; involucre bracts more or less sparsely pubescent, scatteredly to sparsely glandular, scatteredly stellate-pubescent. Flowering July to August.

Caucasus: Western Transcaucasia. Endemic. Described from Latpari Pass (Svanetia). Type in Florence.

561. **H. arvense** N.P. Hier. Mitteleur. I (1885) 750; Zahn in Pflzr. IV, 280, 1520; in Asch. and Graebn. Synopsis, XII, I, 480.

493 Perennial. Stem 40–50 cm high, thin, with bristles moderate below, 1.5–2.0 mm long, thinning upward to none, eglandular, moderately stellate-pubescent; stolons elongated, rather thin, rather densely setose. Basal leaves oblong to lanceolate, obtuse to acute, glaucescent, on both sides scatteredly pubescent, above with stiff and beneath with softer bristles 1.5–2.0 mm long, along midrib moderately and above barely (finely) stellate-pubescent, to moderately pubescent beneath; cauline leaves 2 (coefficient of leafiness 0.04). Inflorescence openly paniculate, with 20–30 capitula; acladium 8 mm long; peduncles sparsely

pubescent, in upper part with occasional, quickly decreasing glands, grayish from stellate down; floral bracts gray. Involucres 7.0–7.5 mm long, cylindrical-ovoid; involucre bracts narrow, subobtusate, dark, with indistinct border, hairs sparse to occasional, light-colored, 1 mm long, scatteredly to sparsely glandular, moderately stellate-pubescent. Flowering June.

Middle montane zone, to 2,250 m.—*European Part*: Crimea; *Caucasus*: Ciscaucasia, Dagestan. *General distribution*: Central Europe. Described from vicinity of Prague. Type in Munich.

562. **H. lasiophorum** N.P. Hier. Mitteleur. I (1885) 752; Zahn in Pflzr. IV, 280, 1524; in Asch. and Graebn. Synopsis, XII, I, 483.—*Exs.*: Zahn, Hier. Europ. No. 338; GRF No. 2053; Pl. Caucas. No. 200.

Perennial. Stem 45–85 cm high, 2–3 mm in diameter, with conspicuous, erect, spreading, light-colored bristles 3–5(–7) mm long along entire length, eglandular, above densely stellate-pubescent, thinning downward, stolons very thin, sometimes partly underground. Basal leaves 1–6, lanceolate, acute, to 15 cm long (7–11:1), light green, on both sides moderately setose with bristles 3–6 mm long, beneath along midrib densely, as a whole to moderately pubescent, scatteredly stellate-hairy above, moderately beneath; cauline leaves 4–6 (coefficient of leafiness 0.08). Inflorescence loosely umbellate; with 10–40 capitula; acladium 5–10 mm long, peduncles with conspicuous hairs 3–5 mm long, eglandular or with occasional glands, gray from down; floral bracts light gray. Involucres 5.5–7.0 mm long, cylindrical; involucre bracts very narrow, acuminate, grayish, with bright green border, with scattered, 20(13–35), light-colored hairs 1.5–2.0 mm long and occasional, 3(2–6), glands 0.1–0.3 mm long, only at tips scatteredly stellate-pubescent. Stigmas yellow. Flowering June to July.

Mountain slopes, forests.—*Caucasus*: Ciscaucasia, Dagestan. *General distribution*: Central Europe. Described from Hungary. Type in Munich.

563. **H. basileucum** Litw. and Zahn in Fedde, Repert. IV (1907) 189 and in Sched. HFR VII (1911) 20; Pflzr. IV, 280, 1521.—*Exs.*: GRF No. 2052; Pl. Caucas. No. 199.

494 Perennial. Stem 40–70 cm high, 1–2 mm in diameter, at base with scattered bristles 2–3 mm long, occasional bristles above, eglandular, rather densely stellate-pubescent above, quickly thinning downward; stolons elongated (to 30 cm), very thin, with short (1 mm long) pubescence, small-leaved. Basal leaves lanceolate to narrowly lanceolate (13:1), acute, yellowish-green or slightly glaucescent, on both sides with occasional bristles 2–3 mm long, beneath along midrib sparsely,

as a whole to scatteredly pubescent, above very sparsely (or not very) stellate-pubescent, scattered pubescence beneath; cauline leaves 4–8 (coefficient of leafiness 0.10), lanceolate, acute, often rather small. Inflorescence openly umbellate-paniculate, with 10–40 capitula; acladium 5–8 mm long; peduncles with occasional hairs and glands (or without them), white-tomentose at tip; floral bracts gray. Involucres 6–7 mm long, cylindrical-ovate; involucre bracts somewhat narrow, subacute, with occasional to sparse, 10(8–16), light-colored hairs 1.5 mm long with dark base, and occasional, 3(1–6), glands 0.2 mm long, with moderate down, densely stellate-white-pubescent at base, along margin glabrous. Flowering June to July.

Dry mountain meadows, to 1,260 m.—*Caucasus*: Ciscaucasia. Endemic. Described from Teberda. Type in Leningrad.

564. *H. echiocephalum* N.P. Hier. Mitteleur. I (1885) 755; Pflzr. IV, 280, 1522; in Asch. and Graebn. Synopsis, XII, I, 482.

Perennial. Stem 30–65 cm high, 2–3 mm in diameter, flexuous, with scattered (above to sparse) hairs 1–2 mm long, eglandular, moderately stellate-pubescent; stolons very long, very thin. Basal leaves narrow, linear-lanceolate, acute, glaucescent, with occasional hairs 1.0–1.5 mm long above, very sparse stellate pubescence above, scattered to moderate beneath; cauline leaves 3–5 (coefficient of leafiness 0.10). Inflorescence loosely umbellate-paniculate, with 6–30 capitula; acladium 14–24 mm long, peduncles scatteredly to sparsely (downward) pubescent, eglandular, gray from stellate down; floral bracts gray. Involucres 6.5–7.0 mm long, cylindrical-ovate; involucre bracts somewhat narrow, acute, light gray, with indistinct green border, with scattered, light-colored, soft hairs 1 mm long, eglandular, at base densely, upward moderately (including up to margin) stellate-pubescent. Corollas light yellow. Involucres greatly resembling *H. echiioides* Lumn. var. *albicinereum* Fr. but distinguished mainly by long thin stolons. Flowering June to July.

European Part: Crimea, *Caucasus*: Eastern and Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from vicinity of Vienna. Type in Munich.

Note. We include here two very closely related species known from Eastern Transcaucasia: *H. setigeriflorum* Kozl. and Zahn (in *Vestn. Tifl. Bot. Sada*, 29, 7; Pflzr. IV, 280, 1522) and *H. brachythrix* Kozl. and Zahn (l. c.), which differ from *H. echiocephalum* N.P. by the presence of glands (although in very small number) on the involucre bracts (and sometimes also on the peduncles). Besides, *H. setigeriflorum* differs from *H. echiocephalum* by having somewhat larger involucres
495 (7–8 mm long), while *H. brachythrix* differs by having a short (8–10

mm long) acladium, glabrous peduncles, and an almost smooth stem and stolons often undeveloped. Type unknown.

565. **H. mirum** N.P. Hier. Mitteleur. I (1885) 757; Zahn, Hier. fl. Mosquens. 56; Pflzr. IV, 280, 1520; Asch. and Graebn. Synopsis, XII, I, 482.—**lc.**: Syreistsch. Fl. Mosk. Gub. III (1910) 363.—**Exs.**: GRF No. 2054a, b.

Perennial. Stem 45–60(–80) cm high, 1.5–2.0 mm in diameter, at base moderately pilose with hairs 3–4 mm long, thinning upward, above with occasional glands quickly thinning to none, moderately stellate-pubescent; stolons greatly elongated, thin. Outer basal leaves oblong-spatulate, rounded-obtuse, inner narrowly lanceolate, acute, glaucous, with sparse, bristles 2.0–2.5 mm long toward margin above or only along margin, rather densely pubescent beneath along midrib, stellate down very sparse above, moderate beneath, and dense along midrib; cauline leaves 3–6 (coefficient of leafiness 0.06). Inflorescence openly umbellate, with 15–25 capitula; acladium 20–35 mm long, peduncles very sparsely pubescent, sparsely glandular, gray from stellate down; floral bracts gray. Involucres 6–7 mm long, cylindrical-ovate; involucre bracts narrow, obtuse, gray, with light-colored border and light-colored, scattered to sparse hairs 1 mm long and scattered glands, quickly thinning downward, rather densely stellate-pubescent. Flowering June to July.

Grassy mountain slopes, mountain meadows, to 2,300 m.—*European Part*: Upper Volga (apparently northern limit of its range); *Caucasus*: Ciscaucasia, Western Transcaucasia. *General distribution*: Central Europe. Described from Hungary. Type in Munich.

566. **H. amaurobasis** Litw. and Zahn in Fedde, Repert. IV (1907) 188; Pflzr. IV, 280, 1522.

Perennial. Stem 60–80 cm high, 3 mm in diameter, at base with scattered bristles 2–4 mm long, with decreasing hairs 1.0–2.5 mm long above, eglandular, with scattered stellate pubescence; stolons to 40 cm long (thinner than in *H. teberdaefontis*), sometimes undeveloped. Basal leaves (6) lanceolate, to 17 cm long (11:1), above with occasional bristles 3–4 mm long, sparsely pubescent beneath but along midrib moderately so, along margin with occasional hairs 1.5–2.0 mm long, as a whole sparsely pubescent, without stellate down above, sparsely pubescent beneath; cauline leaves 5–9 (coefficient of leafiness 0.10). Inflorescence openly umbellate-paniculate, with 15–35 capitula; acladium 8–12 mm long; peduncles sparsely pubescent, with occasional glands, gray from down; floral bracts light-colored. Involucres 5.5–6.5 mm long; involucre bracts subacute, with light-colored border, with hairs

to sparse, 3 mm long, 20(12–23), and sparse, 14(10–21), glands 0.3–0.4 mm long, or with occasional glands (f. *subeglandulosum* Zahn), moderately stellate-pubescent (margin glabrous). Stigmas yellow. Flowering July.

Mountain slopes, in subalpine meadows, at 600–2,100 m.—*Caucasus*: Ciscaucasia, Western and Southern Transcaucasia. Endemic. Described from Mashuk (vicinity of Pyatigorsk). Type in Tbilisi.

567. **H. sublasiophorum** Litw. and Zahn in Fedde, Repert. IV (1907) 188 and in Sched. HFR, VII (1911) 23; Pflzr. IV, 280, 1522.—**Exs.**: GRF No. 2058.

Perennial. Stem 65–75 cm high, 1.5–3.0 mm in diameter, at base with rather conspicuous, upcurved bristles 3–4 mm long, thinning upward, eglandular, with scattered stellate down throughout; stolons elongated, rather thin, distinctly pubescent and stellate-pubescent. Basal leaves 3–6, lanceolate to narrowly lanceolate, acute, to 13 cm long (10–33:1), on both sides with sparse, along edges and beneath along midrib with moderate bristles 2–3(–4) mm long, as a whole to scattered-pubescent, very sparsely stellate-pubescent above; scatteredly so beneath; cauline leaves 5–8 (coefficient of leafiness 0.09), upper very narrow. Inflorescence umbellate-paniculate, with 15–50 capitula; acladium 5–13 mm long, peduncles sparsely pubescent, with occasional glands in upper part, more or less gray-tomentose; floral bracts gray. Involucres 5–6 mm long, cylindrical-ovate; involucre bracts somewhat broad, subacute, dark, with narrow, pale border, with sparse, 18(15–20), light-colored hairs 1.5–3.0 mm long, with black base and equally sparse, 14(11–16), glands 0.3–0.5 mm long, concentrated and larger toward tip, moderately stellate-pubescent, at base rather densely so, along edges glabrous. Stigmas yellow. Flowering June to July.

Stony slopes in subalpine zone, at 2,300 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from Teberda. Type in Leningrad(?).

Note. The distributed specimens (GRF No. 2058) are similar to the ones described, except for the absence of stolons.

568. **H. adjarianum** Peter in Nachr. K. Ges. Wiss. Götting. 1 (1898) 21; Zahn in Pflzr. IV, 280, 1521.

Perennial. Stem 60–70 cm high, moderately setose at base with bristles 3–5 mm long, thinning-pubescent upward, with sparse glands above, extending down to middle of stem, almost without stellate down. Basal leaves narrowly lanceolate, with sparse bristles 4–5 mm long, scarcely stellate pubescent above, to densely beneath; cauline leaves 5–6 (coefficient of leafiness 0.08), abruptly becoming smaller.

497 Inflorescence umbellate-paniculate, with 7–25 capitula; acladium to 12 mm long; peduncles subglabrous, to moderately glandular, gray from stellate down. Involucre 5–6 mm long; involucre bracts to scatteredly pubescent, to moderately glandular, scatteredly stellate-pubescent. Ligules short. Flowering June.

Caucasus: Western Transcaucasia. Endemic. Described from Adzharia (Khula). Type in Florence.

569. **H. submirum** Litw. and Zahn in Fedde, Repert. III (1907) 189; Pflzr. IV, 280, 1521.—*Exs.*: Zahn, Hier. Europ. No. 338a.

Perennial. Stem 50–70 cm high, rather densely covered with hairs 3.5 mm long, eglandular (or very rarely with occasional glands in upper part); stolons very long, with dense white hairs 3.5 mm long, with leaves of average size. Basal leaves lanceolate, as a whole on both sides to moderately setose, bristles 2.5–4.0 mm long, sparsely stellate-downy above but densely so beneath; cauline leaves 5 (coefficient of leafiness 0.08). Inflorescence very spreading-paniculate, with 15–40 capitula; acladium 10–25 mm long; peduncles with sparse hairs and occasional glands, gray from down. Involucre 5.0–6.5 mm long; involucre bracts with scattered, light-colored hairs 1.5–2.5 mm long, with black base, with occasional glands and moderate stellate down. Flowering June to July.

Middle montane zone, at 1,260 m.—*Caucasus*: Ciscaucasia, Eastern Transcaucasia. Endemic. Described from Teberda. Type unknown.

570. **H. sarmentosum** Froel. in DC. Prodr. VII (1838) 202; Zahn in Engl. Pflzr. IV, 280, 1519; Asch. and Graebn. Synopsis, XII, I, 478, non Salisb. (1796), nec Vagner (1893).—*H. pannonicum* N.P. Hier. Mitteleur. I (1885) 753.—*Exs.*: Hier. Naeg. No. 169; Fl. exs. Austro-Hung. No. 3057; GRF No. 2055.

Perennial. Stem 30–60 cm high, 1.5–2.0 mm in diameter, with conspicuous bristles 6–10 mm (f. *longisetum* N.P.) or 3–4 mm long (f. *brevisetum* N.P.), light-colored in lower part, dark above, eglandular, with scattered stellate pubescence above, thinning downward; stolons long (to 25 cm), very thin. Basal leaves 2–5, lanceolate, subacute to acute, to 15 cm long (10–15:1), glaucescent to light green, on both sides with occasional bristles 3–5 mm long, as a whole moderately pubescent, beneath (along veins) very sparsely stellate-pubescent; cauline leaves 3–4(–6) (coefficient of leafiness 0.09), lanceolate, abruptly becoming smaller upward. Inflorescence openly umbellate-paniculate, with 10–35 capitula; acladium 5–12 mm long; peduncles somewhat pubescent, eglandular or with occasional glands, grayish from stellate down above; floral bracts dark or light green. Involucre (5–)6.0–7.5

mm long; involucre bracts narrow, acute, dark with light green border, with sparse, 17(13–22), hairs 2–4 mm long and occasional, 4(2–6), glands 0.3–0.4 mm long, mostly near tip, to sparsely stellate-pubescent. Corollas and stigmas yellow. Flowering June to July. (Plate XIV, Fig. 2.)

498 Grassy mountain slopes, at 1,800–2,100 m.—*European Part*: Upper Dniester, Crimea; *Caucasus*: Ciscaucasia, Dagestan, Eastern, Western, and Southern Transcaucasia. *General distribution*: Central Europe, Mediterranean (eastern part), Balkans-Asia Minor. Described from Hungary. Type in Munich.

Note. A highly polymorphic species forming with *H. tanythrix* N.P., through intermediates, a continuum to the subsection *Bauhinia* (*H. magyaricum* N.P.).

Apparently, *H. semiauriculoides* Zahn (in Fedde, *Repert.* XVI, 182; *Pflzr.* IV, 280, 1519) should also be included in *H. sarmentosum* (Froel.) Zahn. It is distinguished from the latter by denser glandularity on the involucre bracts and peduncles, tending to become scattered, and by less pubescence on the bracts (var. β *subglandulosum*) Zahn in Fedde, *Repert.* III, 190). It is found in the Caucasus (Ciscaucasia). Type unknown.

571. ***H. pareyssianum*** N.P. Hier. *Mitteleur.* I (1885) 758; Zahn in *Pflzr.* IV, 280, 1520.

Perennial. Stem 30 cm high, 1.0–1.5 mm in diameter, with sparse bristles 2–3 mm long, thinning upward to none, eglandular, almost without stellate down; stolons elongated, thin. Basal leaves lanceolate, acute, glaucous, with scattered bristles 4–5 mm long above, sparsely setose beneath, along midrib moderately pubescent, without stellate down above, grayish beneath; cauline leaves 2 (coefficient of leafiness 0.07). Inflorescence openly paniculate, with 7–8 capitula; akladium 10 mm long; peduncles with sparse hairs, eglandular, gray from down. Involucres 7 mm long, cylindrical; involucre bracts narrow, acute, dark, with narrow border, with scattered, dark hairs 1.0–1.5 mm long, sparse glands, and sparse stellate down. Corollas light yellow. Flowering June.

European Part: Crimea; *Caucasus*: Western Transcaucasia. Endemic. Described from Crimea. Type in Munich.

572. ***H. thracicum*** N.P. Hier. *Mitteleur.* I (1885) 759; Zahn in *Pflzr.* IV, 280, 1521; in Asch. and Graebn. *Synopsis*, XII, I, 481.—**Exs.**: GRF No. 2060?

Perennial. Stem 35–50 cm high, thin, slightly flexuous, at base to scattered-pubescent with light-colored hairs 1.5–2.5 mm long, very sparsely pubescent above, almost eglandular, above scatteredly

stellate-pubescent, below without down; stolons elongated, very thin. Basal leaves lanceolate, subacute, glaucescent, on both sides moderately setose with bristles 3–4 mm long, more densely so beneath along midrib, stellate hairs to occasional beneath along midrib; cauline leaves 3–4 (coefficient of leafiness 0.09). Inflorescence compact umbellate-paniculate, with 8–18 capitula; acladium 4–5 mm long; peduncles with sparse hairs and occasional glands, gray from stellate down; floral bracts dark. Involucres 6 mm long, cylindrical; involucre bracts narrow, acute, dark, with light-colored border, with sparse to scattered, 499 dark hairs 1 mm long, and occasional glands, almost without or with sparse stellate down (f. *subfloccosum* Zahn) or with scattered hairs (f. *flocciceps* Zahn). Flowering June to July.

Grassy places in mountains, at 1,250 m.—*Caucasus*: Ciscaucasia. *General distribution*: Balkans-Asia Minor. Described from Thrace. Type in Munich.

Note. The distributed specimens (GRF No. 2060) do not conform to the species diagnosis mainly in the ratio of hairs to glands on the involucre bracts and peduncles.

573. **H. sabiniceps** Litw. and Zahn in Fedde, Repert. III (1907) 190; Pflzr. IV, 280 (1923) 1519.—*H. sabinocephalum* Litw. and Zahn in Sched. HFR, VII (1911) 22.—**Exs.**: GRF No. 2057.

Perennial. Stem 50–60 cm high, 1.5–2.0 mm in diameter, with scattered, spreading hairs 3–5 mm long, hairs at base light-colored but dark above, eglandular, with stellate down—dense above but gradually decreasing downward; stolons elongated, thin, moderately pubescent, with white hairs 2–4 mm long, small-leaved. Basal leaves 1–4, outer spatulate, obtuse, inner oblong-lanceolate, long-attenuate to base, subacute to acute, to 12 cm long (9–13:1), yellowish-green, on both sides moderately setose with bristles 3–5 mm long, as a whole to scatteredly pubescent, above without stellate down, beneath (or only along midrib beneath) with sparse down; cauline leaves (2–)3 (coefficient of leafiness 0.05), small, scatteredly stellate-pubescent beneath. Inflorescence umbellate-paniculate or openly paniculate, with 10–25 capitula; acladium 5–12 mm long; peduncles (conspicuously) with scattered hairs 4 mm long and eglandular or with occasional glands below capitula, to tomentose; floral bracts darkish. Involucres 5–6 mm long, cylindrical-ovate; involucre bracts somewhat narrow, subacute to acute, dark, with indistinct green border, with scattered, 30(25–35), dark hairs 2–3 mm long with black base and almost eglandular, with moderate or scattered stellate down. Corollas light yellow; stigmas yellow. Flowering June to July.

Stony slopes in subalpine zone, at 2,270 m.—*Caucasus*: Ciscaucasia. Endemic. Described from Teberda. Type in Leningrad.

574. *H. umbellosum* N.P. Hier. Mitteleur. I (1885) 755; Zahn in Pflzr. IV, 280, 1516; Asch. and Graebn. Synopsis, XII, I, 476.—**Exs.**: Callier. Iter. Taur. tert. No. 667.

Perennial. Stem 50–85 cm high, 2–4 mm in diameter, at base scatteredly setose, bristles 3–4 mm long, above with occasional glands, quickly thinning downward, without stellate down; stolons elongated, to 20 cm long, thin. Basal leaves 2–4, narrow (10–20:1), lanceolate to linear, acute, glaucous, with sparse bristles 3–4 mm long only along margin, scattered beneath along midrib, without stellate down; cauline leaves 3–6 (coefficient of leafiness 0.07). Inflorescence very openly umbellate, with 10–50 capitula; acladium 8–9 mm long; peduncles almost glabrous, with occasional glands and sparse stellate down below capitula, hairs quickly thinning downward; floral bracts dark. Involucres (6.5–)7.0–7.5 mm long, cylindrical; involucre bracts narrow, acute, dark with light-colored border, with occasional, 10(6–14), light-colored hairs 1–2 mm long and sparse, 17(10–25), fine glands 0.3 mm long, almost without stellate down. Corollas light yellow. Flowering June to July.

European Part: Crimea. *General distribution*: Central Europe. Described from Austria. Type in Munich.

Note. It links the cycles *Pannonica* and *Bauhinia*.

575. *H. tanythrix* N.P. Hier. Mitteleur. I (1885) 754; Zahn in Pflzr. IV, 280, 1517; Asch. and Graebn. Synopsis, XII, I, 477.—*H. praealtum* δ . *setosum* Schur. Enum. pl. Transs. (1866) 383.—*H. svevorum* (Borb.) Zahn in Pflzr. IV, 280 (1923) 518.—**Exs.**: GRF No. 2059(?).

Perennial. Stem 50–60 cm high, 1.0–1.5 mm in diameter, at base moderate or scattered bristles 2.5–5.0 mm long, sparsely pubescent above or almost glabrous, eglandular and without stellate down; stolons very long, very thin. Outer basal leaves somewhat spatulate and obtuse, inner lanceolate, acute (f. *subfloccosum* N.P.) or all narrowly lanceolate, acute (f. *calotrichum* N.P.), glaucescent, above with sparse bristles 2–6 mm long, rather densely pubescent (f. *densipilum* N.P.) along midrib beneath or bristles sparse above, 1.5–2.0 mm long, denser beneath, with stellate down, very sparse above and scattered beneath (f. *subfloccosum* N.P.) or without down on both sides (f. *calotrichum* N.P.); cauline leaves 3–4 (coefficient of leafiness 0.07). Inflorescence openly paniculate, with 8–20 capitula; acladium 7–12 mm long; peduncles with occasional hairs and occasional glands, very sparsely stellate-pubescent; floral bracts light-colored. Involucres 6.5–7.0 mm

long, cylindrical; involucre bracts narrow, acute, dark green, with light-green border, with scattered to moderate light-colored hairs 1–2 mm long, with occasional fine glands, and almost without stellate down. Flowering June.

Groves and edges of mountain forests.—*European Part*: Upper Dniester, Crimea; *Caucasus*: Ciscaucasia, Eastern and Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Hungary. Type in Munich.

Note. The distributed specimens (GRF No. 2059) do not conform to the description of the species: stems very weakly pubescent, peduncles eglandular, involucre bracts sparsely pubescent and almost eglandular. Apparently, the plant from Lazistan, described by G. Zahn (*Vestn. Tifl. Bot. Sada*, 21, 5; *Pflzr.* IV, 280, 1517) under the name *H. xystrophyllum* var. *β. mamnatense* Zahn, closely approaches this species.

576. **H. macroradium** Zahn in *Izv. Kavk. Muzeya*, VII (1912) 133; *Pflzr.* IV, 280, 1517.

501 Perennial. Stem 60–80 cm high, 3–4 mm in diameter, with sparse bristles 5–7 mm long, eglandular and almost without stellate down; stolons to 35 cm long, with rather abundant large leaves. Basal leaves to 7 lanceolate, to 13 cm long (11:1), acute, with sparse bristles 2–4 mm long, without stellate down; cauline leaves 5–6 (coefficient of leafiness 0.07), lanceolate. Inflorescence almost umbellate, with up to 40 capitula, branches long, significantly (3 times) longer than rather long (to 25 mm) acladium; peduncles with occasional, light-colored, thin bristles to 3 mm long, eglandular, very sparsely stellate-pubescent. Involucres 5–6 mm long; involucre bracts narrow, acute, with sparse, 16(13–20), thin bristles 3 mm long and occasional, 2(0–4), glands 0.3–0.4 mm long, with very sparse stellate pubescence at tips. Corollas and stigmas yellow. Flowering June.

Caucasus: Talysh. Endemic. Described from vicinity of Lenkoran. Type in Tbilisi (collected by Hohenacker).

577. **H. subumbelliforme** Zahn in *Pflzr.* IV, 280, 1517.—*H. umbelliforme* Litw. and Zahn in *Sched. HFR* VII (1911) 24, non Iord., nec. Vukot.—**Exs.**: GRF No. 2061a, b.

Perennial. Stem 50–80 cm high, 2–3 mm in diameter, with scattered, spreading bristles 3–4 mm long, very sparsely glandular in upper third, without stellate down, stolons elongated, thin, with scattered bristles 2–3 mm long. Basal leaves 2, lanceolate, to 14 cm long (10–12:1), glaucous, with sparse hairs 3 mm long along margin and beneath along midrib, and equally sparse as a whole, without stellate down; cauline

leaves 3–6 (coefficient of leafiness 0.07). Inflorescence umbellate-paniculate, with 10–50 capitula; acladium 10–22 mm long; peduncles with conspicuous bristles 1.5–4.0 mm long, with sparse, fine (0.3 mm long) glands, thinning downward, with stellate down only below capitula; floral bracts light-colored. Involucres 4.5–6.0 mm long; involucre bracts somewhat broad, subacute, dark green, with clear pale green border, with sparse, 13(10–17), hairs 3 mm long and occasional, 8(6–13), glands 0.3–0.4 mm long, almost without stellate down. Corollas light yellow; stigmas yellow. Flowering June.

Forest edges, seaside meadows.—*Caucasus*: Western Transcaucasia. Endemic. Described from vicinity of village of Mikhailovskaya (near Gelendzhik). Type in Leningrad.

Note. It is a form transitional between *H. bauhini* and *H. auriculoides*.

Cycle 7. Euchaetia Juxip.—*H. euchaetium* N.P. Hier. Mitteleur. I (1885) 764, 842 coll.; Zahn in Pflzr. IV, 280, 1525; in Asch. and Graebn. Synopsis, XII, I, 484; Grossh. Fl. Kavk. IV, 279.—*H. magyaticum-setigerum* N.P. l. c.—*H. bauhini-echioides-pilosella* Zahn in Fedde, Repert. III (1907) 191; Pflzr. l. c.; Asch. and Graebn. Synopsis, l. c.—
 502 In habit resembles *Leptophyta* and conforms in part to the formula *Bauchinia-Rothiana* and in part to *Pannonica-Pilosella*.—Stem 25–60 cm high, sparsely to densely pubescent, above often sparsely glandular, densely stellate-pubescent, flexuous, with more or less long, mostly somewhat slender stolons; cauline leaves 2(–4); inflorescence openly paniculate to shallowly dichotomous, with 4–15 capitula; acladium usually long, 10–35(–130) mm. Involucres (6–)7–9 mm long, more or less globose; involucre bracts acute, with light-colored hairs and often somewhat glandular, gray from stellate down. Corollas yellow; peripheral florets often with red stripes on outside; stigmas yellow. Scattered, in association with *Rothiana* or *Pannonica*.

The type of the cycle, *H. euchaetium* N.P. (*Hier. Mitteleur.* I, 765), apparently is not found in our country.

578. **H. kolenatii** N.P. Hier. Mitteleur. I (1885) 509; Zahn in Pflzr. IV, 280, 1527.

Perennial. Stem 30 cm high, thin, with scattered bristles 3–4 mm long, scatteredly glandular and profusely stellate-pubescent above; stolons very long, thin. Basal leaves lanceolate-spatulate, obtuse to subacute, glaucescent, on both sides moderately setose with bristles 3–4 mm long, without stellate down above, gray beneath from down; cauline leaves 2 (coefficient of leafiness 0.07). Inflorescence shallowly dichotomous, with 4–7 capitula; acladium 10–150 mm long; peduncles



scatteredly hairy, with scattered, quickly thinning glands, gray-tomentose; floral bracts gray. Involucres 7 mm long, hemispherical involucre bracts narrow, acute, blackish, with light-colored border, rather densely covered with dark hairs 2 mm long, with occasional glands, rather densely stellate-pubescent. Corollas red on outer side. Flowering June.

Middle montane zone.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Chaikent. Type in Munich.

579. **H. longum** N.P. Hier. Mitteleur. I (1885) 765; Zahn in Pflzr. IV, 280, 1525; Asch. and Graebn. Synopsis, XII, I, 485.—**Exs.**: Hier. Naeg. No. 51; Fl. exs. Austr.-Hung. No. 3058.

Perennial. Stem 20–60 cm high, at base with rather dense, light-colored hairs 4–6 mm long, thinning upward, with hairs scattered above, 1.5–2.0 mm long, with occasional, quickly thinning glands, densely stellate-pubescent; stolons very long, thin. Basal leaves 2–4, lanceolate, acute (6–8:1), glaucescent (outermost leaves short, spatulate and subobtusate, usually withering before anthesis), on both sides pubescent, above with bristles 4–6 (f. *longipilum* N.P.) or 2–4 mm long (f. *brevipilum* N.P.), beneath with soft hairs, as a whole scatteredly pubescent, along midrib beneath densely hairy, above very sparsely so, beneath grayish-green stellate-pubescent; cauline leaves 2–3 (coefficient of leafiness 0.04). Inflorescence shallowly dichotomous, with 3–15 capitula; acaulium long, 30–130 mm; peduncles with occasional hairs 1.5–2.0 mm long and occasional glands, gray-tomentose; floral bracts gray. Involucres (7–)8.0–8.5 mm long, subglobose; involucre bracts somewhat broad, acute, dark gray, with inconspicuous light-colored border, with sparse, 12(10–16), hairs 1–2 mm long and occasional, 11(8–13), glands 0.3–0.5 mm long, gray from stellate down. Corollas light yellow; peripheral florets at tips red on outer side. Flowering June.

European Part: Crimea. *General distribution*: Central Europe. Described from cultivated specimen. Type in Munich.

580. **H. leptophytomorphum** Litw. and Zahn in Fedde, Repert. III (1907) 191 and in Sched. HFR XLII (1910) 11; Pflzr. IV, 280, 1526.—**Exs.**: GRF No. 2074.

Perennial. Stem to 55 cm high, thin, with moderate, light-colored, dark-based hairs 2.5–4.0 mm long, above with occasional, quickly thinning glands, above densely stellate-pubescent, thinning toward base; stolons long, thin, flexuous, with moderate hairs 2–3 mm long, stellate-pubescent (often undeveloped). Basal leaves lanceolate, long (to 18 cm), acute, narrow (15:1) (outer leaves shorter, spatulate, subobtusate, usually withering before anthesis), yellowish-green (not glaucescent),

on both sides with sparse, toward base to scattered bristles 3–6 mm long, without stellate down above, scatteredly pubescent beneath; cauline leaves 2 (coefficient of leafiness 0.04), upper leaf linear, mostly with stellate down on both sides. Inflorescence shallowly dichotomous, with 5–12 capitula; acladium to 35 mm long; peduncles moderately pubescent, scatteredly glandular, grayish-tomentose; floral bracts grayish-green. Involucres 6.0–7.5 mm long, later broadly ovate; involucre bracts narrow, acute, darkish, pale-bordered, rather densely covered with light-colored hairs 1.5–2.0 mm long, with black base, sparsely glandular, moderately stellate-pubescent. Corollas yellow, without red tint. Flowering June.

Montane oak forests.—*Caucasus*: Ciscaucasia. Endemic. Described from Teberda. Type in Leningrad.

Note. *H. callieri* Oborny (Callier, *Iter. Taur.* III, 1900, No. 905; *Pflzr.* IV, 280, 1528) belongs here. It is distinguished by (insofar as can be judged from the very incomplete diagnosis), the densely setose stem with bristles 3–5 mm long, 3–4 cauline leaves (coefficient of leafiness 0.07) and dense glands on the peduncles (glands decreasing rapidly toward the stem). It is found in the vicinity of Simferopol. Type unknown.

506 **Subsection 4. Praeltocymosina** Juxip.—Without stolons or with *Bauhinia*-type stolons; stellate pubescence more or less conspicuous on all parts; pubescence mostly short, more or less soft; inflorescence umbellate-paniculate, more or less many-headed.

1. Plant without stolons, often with collateral stems and runners...2.
- + Plants with stolons.....6.
2. Involucral bracts entirely glabrous (or glands many times more than hairs).....581. **H. perfugii** Juxip
- + Hairs and glands on involucral bracts in equal number or hairs more than glands.....3.
3. Hairs on involucral bracts many times more than glands (roughly in ratio of 80:20).....582. **H. cyrtophyllum** Norrl.
- + Hairs and glands on involucral bracts more or less in equal number or ratio of hairs to glands 1:2.....4.
4. Hairs and glands on involucral bracts more or less in equal number; stem and leaves beneath with hairs 2–3 mm long; involucres 6–7 mm long.....583. **H. zizianum** Tausch
- + Hairs and glands on involucral bracts in ratio of 1:2; stem and leaves with short (0.5–1.0 mm) hairs.....5.
5. Cauline leaves 3–5; involucres short, 5.0–5.5 mm long.....584. **H. amauranthum** Peter

- + Cauline leaves 2–3; involucre longer, 6–7 mm long.....585. **H. leptophyllum** N.P.
- 6 (1). Hairs on involucre bracts moderate to scattered.....7.
- + Hairs on involucre bracts occasional to more or less sparse.....9.
- 7. Glands on involucre bracts in appreciable numbers (moderate to scattered); branches of inflorescence very long, much longer than acaulium; all basal leaves narrowly lanceolate and acute.....586. **H. longiradiatum** Zahn
- + Glands on involucre bracts sparse to solitary.....8.
- 8. Peduncles with sparse or occasional glands; involucre 6.5–7.0 mm long; all basal leaves linear-lanceolate, very acute, glaucous to light green, with stellate down only beneath.....588. **H. acrosciadium** N.P.
- + Peduncles almost eglandular; involucre 7–8 mm long; outer basal leaves oblong, obtuse, inner lanceolate, acute, yellowish-green, with stellate down on both sides; stolons long, mostly underground.....589. **H. cymosiforme** N.P.
- 9. Glands on involucre bracts and on peduncles in appreciable quantity (scattered).....592. **H. mnoophorum** N.P.
- 507 + Glands on involucre bracts and on peduncles occasional or barely to sparse.....10.
- 10. Hairs on plant (stem, leaves, peduncles, and involucre bracts) 1–3 mm long; leaves with stellate down only beneath.....590. **H. umbelliferum** N.P.
- + Hairs on plant short, 0.5–1.0 mm.....11.
- 11. Leaves with stellate down on both sides.....591. **H. semicymerum** Zahn
- + Leaves with stellate down only beneath.....12.
- 12. Plant from European part of Soviet Union.....587. **H. wjasowoënsë** Zahn
- + Plant from Altai.....593. **H. lydiae** Schischk. and Steinb.

Cycle 1. Ziziana Juxip.—*H. zizianum* Tausch in Flora, XI (1828) Erg.-Bl. I, 58; N.P. Hier. Mitteleur. I, 714, 837; Fedtsch. and Flerow, Fl. Evrop. Ross. 1094.—*H. florentinum-cymosum* N.P. op. cit; Zahn in Pflzr. IV, 280 (1923) 1485.—*H. piloselloides-cymosum* Zahn in Hegi, Ill. Fl. VI, 2 (1929) 1236; Asch. and Graebn. Synopsis, XII, I, 428.—*H. asperum* Tausch l. c. ex N.P. l. c.—*H. collinum* γ. *zizianum* Froel. in DC. Prodr. VII (1838) 203.—*H. praealtum* var. *zizianum* Döll. Fl. Bad. II (1859) 868 p. p.; Fr. Epicr. 22.—*H. cymosum* ssp. *fallax* Suder, Hier. Centr. Fr. (1902) 96.—Stem 30–80 cm high, often thick, mostly with collateral stems and often with runners; stolons absent (or very rarely, very short as if rudimentary). Outer basal leaves spatulate, obtuse,

others lanceolate, acute, glaucescent, mostly scarcely stellate-pubescent above, sparsely to moderately so beneath; cauline leaves 2–5 (–9), often with occasional glands. Inflorescence umbellate or paniculate downward, with 1–3 remote lower branches, many-headed (to 100 capitula), less often few-headed; peduncles tomentose. Involucres 5–8 mm long; involucre bracts acute, dark to black, mostly bordered; pubescence highly variable, mostly short (influence of *H. vaillantii*), glands sparse to almost dense, stellate pubescence more or less dense (conspicuous).

The species of this cycle are considered ancient hybrids, conforming to the formula *H. piloselloides-cymosum* (in our country often *H. piloselloides-vaillantii*). All intermediate species of sections *Praealtina* and *Cymosina* have adapted themselves to the climate of northern Europe better than their progenitors, going beyond the geographical boundaries of their range.

The cycle *Ziziana* is highly polymorphic; its species often are distributed abundantly and in association with each other in the Soviet Union, particularly in the northwestern part. In the eastern half of the European territory of the Soviet Union, it is replaced by *H. umbelliferum* N.P. (= *H. tauschii* Zahn).

581. ***H. perfugii*** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 529.

- 508 Perennial. Stem 25–80 cm high, 2.5 mm in diameter, with scattered, light-colored bristles 2.5 mm long, above with occasional glands, often with floriferous collateral stems. Basal leaves 3–10, oblong-lanceolate to narrowly lanceolate, obtuse to subacute, to 12 cm long (10:1), glaucescent, with occasional hairs 2.5 mm long above, hairs 1.0–1.5 mm long beneath and along margin, hairs along midrib scattered, 2 mm long, as a whole pubescence to scattered, stellate down absent above, scattered beneath; cauline leaves 2–7 (coefficient of leafiness 0.10), lanceolate, acute, abruptly becoming smaller, pubescence sparser, stellate pubescence as on basal leaves. Inflorescence umbellate-paniculate with 7–40 capitula; akladium 6–8 mm long; peduncles not pilose, sparsely glandular, more or less tomentose. Involucres 5.5–7.0 mm long; involucre bracts somewhat broad, obtuse, glabrous (or with occasional hairs), with scattered, 24(22–27), glands 0.3–0.5 mm long, and very sparse stellate down. Stigmas yellow. Flowering June to July.

Dry sandy places, often as association.—*European Part*: Baltic Region (Estonian SSSR). Endemic? Described from vicinity of Tallin. Type in Tartu.

Note. It is similar to *H. asikkalense* Norrl. (*Nya nord. Hier.* I, 92; *Pflzr.* IV, 280, 1487; **Exs.**: Norrl. *Hier. exs. fasc.* IV, Nos. 41, 42),

differing from it by having a larger number of cauline leaves (in *H. asikkalense*, the coefficient of leafiness is 0.04). Type in Helsinki.

582. **H. cyrtophyllum** Norrl. Nya nord. Hier. I (1904) 85; Mela-Cajander, Suom. Kasvio. 658; Zahn in Pflzr. IV, 280, 1492.—Exs.: Norrl. Hier. exs. fasc. IV, Nos. 34–37.

Perennial. Stem 30–50 cm high, 2 mm in diameter, flexuous, in lower part moderately covered with hairs 1.5–2.5 mm long, above with occasional glands, with moderate stellate down, with floriferous collateral stems. Basal leaves 5–10, lingulate to lanceolate, subobtuse to acute, to 14 cm long (10:1), grass-green or glaucescent, above with occasional bristles to 4 mm long, beneath and along margin with hairs 2–3 mm long, as a whole to sparsely pubescent; without stellate down above, with moderate down beneath; cauline leaves 2–4 (coefficient of leafiness 0.07). Inflorescence umbellate-paniculate, with 7–20 capitula; aelodium 15 mm long; peduncles sparsely pubescent, with sparse or occasional glands, gray-tomentose. Involucres 6.5–7.5 mm long; involucre bracts somewhat narrow, subobtuse, white-bordered, with scattered (20–35) dark hairs 1.5–2.0 mm long and occasional (5–10) glands 0.3–0.4 mm long, to densely stellate-pubescent. Corollas light yellow; stigmas yellow. Flowering June to July.

Sandy or stony slopes, cliffs ledges.—*European Part*: Karelia-Lapland (Khibiny Mountains, introduced), Baltic Region (Estonian SSR), Ladoga-Ilmen. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki, paratype in Leningrad.

509 583. **H. zizianum** Tausch in Flora, XI (1828) Erg.-Bl. I, 62; N.P. Hier. Mitteleur. I, 718; Zahn, Hier. fl. Mosquens, 52; Pflzr. IV, 280, 1490; Asch. and Graebn. Synopsis. XII, I, 435; sub *H. eu-zizianum* (Tausch) Zahn.—*Ic.*: Syreistsch. Fl. Mosk. Gub. III (1910) 361.—*Exs.*: Zahn, Hier. Europ. No. 14; Petrak, No. 991.

Perennial. Stem 40–80 cm high, 2–3 mm in diameter, more or less hollow, without stolons but often with well developed, runner-like collateral stems, with scattered, light-colored hairs 2–3 mm long below and scattered, black, setaceous hairs above, with sparse to moderate glands above, thinning downward to none, to densely stellate-pubescent. Basal leaves 4–10, outer oblong, spatulate, obtuse, others lanceolate to narrowly lanceolate, acute, glaucescent, on both sides pubescent; pubescence to moderate above with short (0.5–1.0 mm) or somewhat longer (1.5–3.0 mm) hairs, pubescence to scattered beneath, along midrib moderate, stellate pubescence usually on both sides: sparsely above, and often only along midrib, more or less dense beneath; cauline leaves 2–5 (coefficient of leafiness 0.07), gradually

becoming smaller, borne up to $4/5$ of stem length, upper leaves somewhat glandular at tips. Inflorescence umbellate-paniculate with 10–40 (–100) capitula, crowded to open, 1–3 lower branches remote, arcuately upcurved; acladium 6–24 mm long; peduncles with sparse hairs and sparse to rather dense glands, gray-tomentose; floral bracts dark. Involucres 6–7 mm long, ovate; involucral bracts somewhat broad, subacute, dark gray, with indistinct pale border, to moderately (but sometimes even less) covered with light-colored hairs 1.0–2.5 mm long, with occasional to rather dense glands 0.1–0.3 mm long and rather dense stellate pubescence (but absent along margin). Corollas more or less light yellow; sometimes with short ligules or tubular; stigmas yellow. Flowering June to July.

Dry grassy meadows, scrubs, on sands, slopes and old fields.—*European Part*: Dvina-Pechora, Baltic Region, Ladoga-Ilmen, Upper Volga, Volga-Don. *General distribution*: Scandinavia (southern part), Central Europe. Described from Bavaria. Type in Munich.

Note. A highly polymorphic species, distinguished by the degree and proportions of the types of pubescence.

Tausch's authentic specimen is unknown, hence Naegeli and Peter treat Tausch's plant as *H. praealtum* var. *ziziana* (distributed by Schultz-Bip. in the *Cichoriaceothesca*, under No. 111), considering it as the type of the species. (For the original diagnosis of Tausch's species, see note on page 6[sic; source not clear—Gen. Ed.])

Three species found in the Ladoga Lake part of Karelia (Ladoga-Ilmen) should be included here: *H. incrassatiforme* Norrl. *Nya nord. Hier.* I (1904) 87; Mela-Cajander, *Suom. Kasvio*, 659; *Pflzr.* IV, 280, 1492; exs. Norrl. fasc. IV, No. 38; *H. austericaule* Norrl. *Nya nord. Hier.* I (1904) 91; Mela-Cajander, *Suom. Kasvio*, l. c, *Pflzr.* l. c. *H. abortiens* Norrl. *Nya nord. Hier.* I (1904) 90; *Pflzr.* IV, 280, 1491. Types in Helsinki.

- 510 584. **H. amauranthum** Peter in Nachr. K. Ges. Wiss. Götting, 2 (1893) 81; Zahn, *Hier. fl. Mosquens.* 51; *Pflzr.* IV, 280 (1923) 1488.

Perennial. Stem 40–60 cm high, thick, moderately pubescent in lower part with hairs 0.5 mm long, thinning upward, with occasional glands above, sparsely stellate-pubescent. Basal leaves oblong, obtuse, to lanceolate, barely or sparsely short-pubescent with hairs 0.5 mm long, scarcely above to scatteredly stellate-pubescent beneath; cauline leaves 3–5 (coefficient of leafiness 0.08), with occasional glands. Inflorescence umbellate-paniculate, with 30–60 capitula; peduncles with occasional hairs, moderately glandular, scatteredly stellate-pubescent. Involucres 5.0–5.5 mm long; involucral bracts narrow, dark, hardly

bordered, with sparse, dark, hairs 0.5 mm long, to scattered-glandular, with sparse down. Flowering June to August.

Grassy places.—*European Part*: Ladoga-Ilmen, Upper Volga. Endemic? Described from Bronnitsy District of Moscow Region. Type unknown.

585. ***H. leptophyllum*** N.P. Hier. Mitteleur. I (1885) 725; Zahn, Hier. fl. Mosquens. 51; Pflzr. IV, 280, 1489; Asch. and Graebn. Synopsis, XII, I, 433.

Perennial. Stem 50–60 cm high, 1.5–2.0 mm in diameter, in lower part with sparse, light-colored hairs 0.5–1.0 mm long, in upper part with occasional dark hairs, above with scattered glands thinning downward and with conspicuous stellate down also thinning downward. Basal leaves lanceolate to narrowly lanceolate, acute, glaucescent, above with sparse to scattered bristles 0.5–1.0 mm long, with sparse stellate down above, scattered beneath, cauline leaves 2–3 (coefficient of leafiness 0.05), with occasional glands. Inflorescence umbellate-paniculate, more or less open, with 10–20 capitula; acladium 6–12 mm long; peduncles glabrous or to sparsely pubescent, with rather dense glands, grayish-tomentose; floral bracts dark. Involucres 6–7 mm long; involucral bracts narrow, acute, blackish, almost without border, with scattered, dark hairs 0.5 mm long, rather densely glandular, moderately stellate-pubescent. Corollas dark yellow. Flowering June to July.

Meadows.—*European Part*: Dvina-Pechora, Upper Volga. *General distribution*: Central Europe. Described from Silesia. Type in Munich.

Cycle 2. Umbellifera Juxip.—*H. umbelliferum* N.P. Hier. Mitteleur. I (1885) 795, 839; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1094; Zahn, Hier. fl. Mosquens. 53.—*H. magyricum-cymosum* N.P. l. c.—*H. bauhini-cymosum* Zahn in Koch, Synopsis. 3, II (1901) 1754.—*H. tauschii* Zahn in Pflzr. IV, 280 (1923) 1500; Asch. and Graebn. Synopsis. XII, I, 445.—*H. radiocaula* Froel. in DC. Prodr. VII (1838) 202 p. p.—It is parallel to cycle *Ziziana* in origin and is distinguished essentially only by having thin, small-leaved stolons. In habit, 511 resembles plants of cycle *Bauhinia*, differing by having wider leaves that are distinctly stellate-pubescent beneath, an inflorescence that is at least umbellate at tip, and more stellate pubescence than in *Bauhinia*; plant more or less conspicuously pubescent, glands usually sparse; leaves lanceolate to narrowly lanceolate, less often outer ones spatulate and obtuse, often with fine, spine-like teeth; cauline leaves sometimes with occasional glands; stigmas yellow.

In distribution area of both progenitors, i.e., in eastern part of European territory of Soviet Union (individual members enter Western Siberia).

586. **H. longiradiatum** Zahn, Hier. fl. Mosquens. (1911) 54; Pflzr. IV, 280, 1506.

Perennial. Stem to 60 cm high, at base rather densely, above scatteredly covered with black hairs and scatteredly glandular; stolons very long, thin. Basal leaves linear-lanceolate, oblong, more or less acute, glaucescent, with occasional hairs above, scatteredly hairy beneath along midrib, above barely stellate-pubescent, beneath scatteredly downy; cauline leaves 2-3 (coefficient of leafiness 0.05). Inflorescence umbellate-paniculate, with up to 50 capitula, inflorescence branches very long, much longer than acladium; peduncles with occasional hairs, scatteredly glandular, gray from down. Involucres 5-6 mm long; involuclral bracts somewhat narrow, with scattered hairs and scattered glands, scatteredly stellate-pubescent. Flowering June.

Meadows.—*European Part*: Upper Volga. Endemic. Described from Moscow Region. Type unknown.

587. **H. wjasowoënsë** Zahn in Pflzr. IV, 280 (1923) 1506.—**Exs.**: GRF No. 1299, sub *H. neilreichii* N.P.

Perennial. Stem 50-70 cm high, 1.5-2.0 mm in diameter, in lower part scatteredly, above very sparsely short-pubescent, with occasional fine glands, scatteredly stellate-pubescent; stolons very long, very thin. Basal leaves 2, lanceolate to narrowly lanceolate, subacute to acute, 8-11:1, glaucescent, above almost glabrous, as a whole to sparsely pubescent with hairs 0.6-1.0 mm long, only beneath scatteredly stellate-pubescent; cauline leaves 2-3 (coefficient of leafiness 0.05), with occasional glands at tip. Inflorescence openly, paniculate-umbellate, with 16-20 capitula; peduncles with occasional hairs and occasional glands, grayish-tomentose; floral bracts gray. Involucres 5-6 mm long; involuclral bracts somewhat broad, acute, with broad, green border, with occasional, 7(4-12), light-colored hairs 1.0-1.5 mm long, and occasional to sparse, 9(4-16), glands 0.3 mm long, moderately stellate-pubescent (but margin glabrous). Stigmas yellow. Flowering June.

Meadows.—*European Part*: Volga-Don Region. Endemic? Described from Lebedyan District of Tambov Region. Type in Leningrad.

512 588. **H. acrosciadium** N.P. Hier. Mitteleur. I (1885) 737; Zahn Hier. fl. Mosquens. 54; Pflzr. IV, 280, 1503; Asch. and Graebn. Synopsis, XII, 448.—**Exs.**: Zahn, Hier. Europ. No. 139.

Perennial. Stem 50–65 cm high, 1.5–2.5 mm in diameter, in lower part with scattered, light-colored but above with dark hairs 2–4 mm long, eglandular, moderately stellate-pubescent above; stolons very long, thin. Basal leaves linear-lanceolate, very acute, glaucous to light green, sparsely hairy above, to scatteredly beneath along midrib, with hairs 2–3 mm long, only beneath with sparse stellate down; cauline leaves 2–3 (coefficient of leafiness 0.04). Inflorescence umbellate-paniculate, more or less open, with 15–35 capitula; peduncles with scattered hairs 2 mm long and sparse or occasional glands, gray-tomentose. Involucres 6.5–7.0 mm long; involucre bracts narrow, acute, blackish, with light-colored border, with scattered, light-colored hairs 1 mm long and sparse to occasional glands, sparsely stellate-pubescent. Corollas light yellow, often tubular. Flowering June to July.

Meadows.—*European Part*: Upper Volga. *General distribution*: Central Europe. Described from Bavaria. Type in Munich.

589. *H. cymosiforme* N.P. Hier. Mitteleur. I (1885) 736.—*H. radiocaulis* α . *cymosiforme* Hayek, Fl. Steierm. II (1914) 756.—*H. subcymosiforme* Zahn in Pflzr. IV, 280 (1923) 1507; Asch. and Graebn. Synopsis, XII, I, 455.—*Exs.*: Zahn, Hier. Europ. No. 729.

Perennial. Stem 50–60 cm high, 1.5–2.0 mm in diameter, at base rather densely pubescent with light-colored hairs 0.5–1.0 mm long, thinning upward, dark above, with occasional glands above and gray-stellate-pubescent; stolons long, thin, mostly underground but sometimes above-ground, to 20 cm long, rather large-leaved, strongly pubescent (f. *strictistoloniferum* Zahn). Outer basal leaves oblong, obtuse, inner ones lanceolate, subacute to acute, yellowish-green, on both sides moderately pubescent with hairs 0.5 mm long and equally stellate-pubescent, sparsely so above, scatteredly beneath, along midrib rather densely so; cauline leaves 2–3 (coefficient of leafiness 0.05), lanceolate, acute, eglandular. Inflorescence somewhat crowded-umbellate, with 30–35 capitula; floral bracts whitish; peduncles with scattered hairs, almost eglandular, white-tomentose. Involucres 7–8 mm long, cylindrical; involucre bracts narrow, acute, dark, scarcely bordered, moderately (to scatteredly) pubescent with hairs 0.5 mm long and very few, fine glands 0.2–0.3 mm long, with rather dense stellate down over entire surface. Flowering June to July.

Grassy places and meadows.—*European Part*: Upper Dniester. *General distribution*: Central Europe. Described from Austria. Type in Munich.

Note. This species is very close to *H. vaillantii* Tausch but differs mainly by the presence of long, thin stolons.

- 513 590. **H. umbelliferum** N.P. Hier. Mitteleur. I (1885) 738; Zahn in Hier. fl. Mosquens. 54.—*H. eu-umbelliferum* Zahn in Pflzr. IV, 280 (1923) 1506; Asch. and Graebn. Synopsis. XII, I, 454.—**lc.**: Syreistsch. Fl. Mosk. Gub. III (1910) 363.—**Exs.**: Zahn, Hier. Europ. No. 20.

Perennial. Stem 50–80 cm high, 1.5–2.0 mm in diameter, above with sparse, dark hairs 1–2 mm long, decreasing downward, above with occasional glands and sparse stellate pubescence, stems often several; stolons very long, thin, with 5–10, mostly small leaves. Basal leaves 6–8; outer spatulate, obtuse, inner lanceolate, acuminate, glaucescent, sparsely setose above, more densely so beneath along midrib, with bristles 2–3 mm long, sparsely stellate-pubescent only beneath; cauline leaves 3 (coefficient of leafiness 0.05), lanceolate, acute, eglandular at tip. Inflorescence more or less umbellate, somewhat open, with 25–40 capitula; peduncles sparsely pubescent, with occasional glands, grayish from down; floral bracts dark gray. Involucres 6–7 mm long, ovoid; involucre bracts somewhat broad, acute, dark, with light-colored border, with sparse, 15(10–20), light-colored hairs 1.0–2.0 mm long and sparse, 11(6–14), glands 0.3 mm long, scarcely to moderately stellate-pubescent. Corollas yellow; stigmas yellow. Flowering June to July.

Meadows, scrubs and old fields.—*European Part*: Baltic Region (Lithuanian SSR), Upper Volga, Upper Dnieper, Volga-Don, Upper Dniester. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Bavaria. Type in Munich.

Note. A highly polymorphic species, distinguished by the degree and proportion of the types of pubescence. Particularly many taxa have been described from Galicia. A number of the species included here have been described by Blocki and Rehmann from the vicinity of Lvov: *H. ciesielskii* Blocki, *H. melanolepium* Rehm., *H. pycnomnoon* Rehm., *H. subexellens* Zahn = *H. exellens* Blocki (Zahn, Pflzr. IV, 280, 1501–1507). We are restricting ourselves here to mentioning them only.

591. **H. semicymigerum** Zahn in Schedis and HFR VI (1908) 93; Pflzr. IV, 280, 1505.—**Exs.**: GRF No. 1845; Zahn, Hier. Europ. No. 437a.

Perennial. Stem 50–65 cm high, at base with conspicuous, but above with sparse hairs 0.5–1.0 mm long, above with scattered glands, quickly thinning downward, distinctly stellate-pubescent; stolons long, thin, covered with rather prominent leaves (but often undeveloped). Basal leaves 2–3, outer spatulate, obtuse, others lanceolate, acute, glaucescent, above with very sparse hairs 0.5–1.0 mm long and occasional stellate down, beneath sparsely pubescent; cauline leaves 3–4 (coefficient of leafiness 0.06). Inflorescence umbellate-paniculate, with 10–25 capitula; peduncles with occasional hairs, 0.5–1.0 mm long,

sparsely glandular, gray-tomentose. Involucres 5.5–6.6 mm long; involucre bracts with sparse, 10(5–16), hairs 1 mm long and sparse, 514 14(11–17), glands 0.3–0.4 mm long, densely stellate-pubescent. Stigmas yellow. Flowering June to July.

Birch forests.—*European Part*: Upper Volga. Endemic? Described from Staritsa, Kalinin Region. Type in Leningrad.

Note. It is very similar to *H. umbelliferum* N.P. but differs from it by having shorter pubescence and stellate down on both sides of the leaves.

592. *H. mnoophorum* N.P. Hier. Mitteleur. I (1885) 767; Zahn in Pflzr. IV, 280, 1501.—*H. magyricum-incanum* N.P. l. c.

Perennial. Stem to 45 cm high, 2–3 mm in diameter, with occasional bristles 1 mm long, above with occasional, gradually thinning glands, scatteredly stellate-pubescent; stolons somewhat elongated, thickish, with scattered hairs 0.5 mm long, with remote small leaves. Basal leaves numerous, oblong-lanceolate, obtuse or subobtuse, glaucescent, to 9 cm long, above with occasional bristles 1–2 mm long, stellate pubescence very sparse on both sides or only beneath; cauline leaves 3 (coefficient of leafiness 0.07), with stellate down beneath, eglandular. Inflorescence umbellate-paniculate, with 25 capitula, with remote lower branch; peduncles glabrous, with scattered glands, gray-tomentose; floral bracts light-colored. Involucres 6.0–6.5 mm long, cylindrical; involucre bracts narrow, acute, dark, with light-colored border, with occasional, 4(3–6), dark hairs 0.5–1.0 mm long and sparse, 15(12–16), glands 0.4 mm long, with scattered stellate down, margins glabrous. Flowering August.

Meadows, a very rare plant.—*European Part*: Upper Volga. Endemic? Described from vicinity of Moscow. Type in Munich.

Note. Apparently, *H. subpenicillatum* Zahn (Pflzr. IV, 280, 1501) = *H. penicellatum* Peter in Nachr. K. Ges. Wiss. Götting, 2, 80; Zahn, Hier. fl. Mosquens. 55, should be referred to this species. It differs from *H. mnoophorum* N.P. by having only a very small number of glands on the peduncles, very small (4–5 mm) involucres and longer (2–3 mm) hairs on all parts of the plant. In the USSR, it is found in the Upper Volga and Volga-Don regions. Described from Moscow Region (Bronnitsy). Type specimen unknown.

H. cymosocephalum Rehm. (Verh. zool.-bot. Ges. Wien, XLVII, 309; Zahn in Pflzr. IV, 280, 1502), described from the vicinity of Lvov and, according to Zahn, found eastward in Ukraine (without precise indication of the collection location), should be included here also.

593. *H. lydiae* Schischk. and Steinb. in Sist. Zam. Gerb. Tomsk. Univ. 1-2 (1949) 25; Fl. Zap. Sibiri, XI, 3067.

Perennial. Stem to 80 cm high, to 3 mm in diameter, with occasional hairs, and above with occasional glands, scatteredly stellate-pubescent. Basal leaves oblong-obovate, obtuse to oblong-lanceolate, short-acuminate, to 8 cm long, glaucescent, glabrous above, sparsely covered with short, soft hairs along margin and beneath along midrib and slightly stellate-downy only beneath; cauline leaves 2-4 (coefficient of leafiness 0.05), lanceolate, narrow. Inflorescence umbellate-paniculate, with many capitula; peduncles with occasional hairs and glands, densely stellate-pubescent. Involucres 5-7 mm long; involucral bracts with occasional hairs and glands, rather densely stellate-pubescent. In habit, resembles *H. umbelliferum* N.P. Flowering June.

Ravines.—*Western Siberia*: Altai. Endemic. Described from Biisk District. Type in Tomsk.

Note. In Siberia it replaces *H. wjasowoënsæ* Zahn.

Subsection 5. Praealtopratsensina Juxip.—In habit resembles species of section *Pratsensina*, without stolons or often with long *Bauhinia*-type stolons; stellate pubescence more or less scattered, pubescence to moderate; coefficient of leafiness low (0.02-0.08); cauline leaves (0-)1-4(-5); inflorescence openly paniculate, mostly with small number of capitula, 2-20(-25); glands in inflorescence mostly in significant number and well-developed, 0.4-0.5 mm long.

1. Inflorescence mostly openly paniculate, mostly with small number of capitula 2-20(-25).....2.
- + Inflorescence shallowly dichotomous, with 3-8 capitula; acladium to one-fourth as long as stem; plants with stolons, covered with many, rather large leaves; stellate pubescence of plant conspicuous (in lower part hyaline-tomentose); involucres 7.5-8.5 mm long.....600. *H. leptoclados* N.P.
2. Plants without stolons (or sometimes stolons underground or rudimentary).....3.
- + Plants with long and mostly thin stolons.....7.
3. Peripheral florets yellow on outside (florets one-colored).....4.
- + Peripheral florets reddish on outside; leaves with stellate down on both sides; involucral bracts moderately glandular.....599. *H. erythrochristum* N.P.
4. Involucral bracts with sparse to scattered glands.....5.
- + Involucral bracts (and peduncles) with occasional glands; leaves above without stellate down, with down beneath only along midrib.....596. *H. curvulum* Norrl.

5. Involucral bracts to sparsely glandular; leaves above with stellate down along midrib, beneath with sparse down.....595. **H. arvicola** N.P.
- + Involucral bracts to scatteredly glandular.....6.
6. Involucral bracts with sparse, black hairs 1 mm long; peduncles eglandular; leaves with stellate down beneath along midrib; involucral bracts 6.5–7.5 mm long.....597. **H. assimilatum** Norrl.
- 516 + Involucral bracts glabrous; leaves completely without stellate down; involucral bracts 5.5–6.0 mm long.....598. **H. apatorium** N.P. var. β . **subspathophyllum** Zahn
- 7 (2). Corollas orange, peripheral florets with red stripes on outer side.....594. **H. calomastix** N.P.
- + Corollas yellow.....8.
8. Leaves sparsely stellate-pubescent above along midrib, to scatteredly so beneath; cauline leaves 2–3(–5). Involucres 7.5–8.5 mm long; involucral bracts acute, rather densely pale-pubescent.....601. **H. obornyanum** N.P.
- + Leaves without stellate down above; beneath down only along midrib (sparse); cauline leaves 0–1(–2). Involucres 8–9(–10) mm long; involucral bracts subobtusate, glabrous or with occasional hairs (less often dense).....602. **H. acrothyrsum** N.P.

Cycle 1. Calomasticia Juxip.—*H. calomastix* N.P. Hier. Mitteleur. I (1885) 657; Zahn in Pflzr. IV, 280, 1473, ut *H. bauhinii-aurantiacum*.—Corollas orange, peripheral ones with red stripes on outer side; stolons very long, slender, resembling those of *Bauhinia*.

594. **H. calomastix** N.P. Hier. Mitteleur. I (1885) 657, 829; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1090; Pflzr. IV, 280, 1473; Asch. and Graebn. Synopsis, XII, I, 410, etiam ut *H. bauhinii-aurantiacum*.—*H. bauhinii* \times *aurantiacum* Zahn in Koch, Synopsis, 3, II (1901) 1748.—Exs.: Hier. Naeg. No. 48.

Perennial. Stem 35–50(–80) cm high, 2–3 mm in diameter, at base with rather dense light-colored bristles, above with sparse, dark hairs 3–5 mm long, above with scattered glands decreasing downward, with sparse stellate down; stolons very long, thin, often reddish, with more or less small leaves (resembling stolons of *Bauhinia*). Basal leaves 1–4, spatulate, oblong, obtuse to lanceolate and acuminate, glaucous or glaucescent, soft, along margin and midrib beneath with moderate bristles 3–5 mm long, without stellate down (or with very sparse down beneath along midrib); cauline leaves 2–3; (coefficient of leafiness 0.05), in lower half of stem. Inflorescence paniculate, compact, later becoming open, with 6–12(–25) capitula; acladium short, 4–8 mm;

peduncles almost without hairs, moderately glandular, gray-tomentose; floral bracts gray or green, with light-colored border. Involucres 6.0–8.5 mm long, cylindrical; involucre bracts somewhat narrow, subobtusate, blackish, with narrow green margin, with very sparse, dark hairs 1.0–1.5 mm long, with glands to scattered and sparse stellate down. Corollas orange, peripheral ones with red stripes outside; stigmas orange or somewhat dark. Flowering June to July.

517 Grassy places.—*European Part*: Upper Dnieper(?), Upper Dniester (Carpathians). *General distribution*: Central Europe (eastern part). Described from Bavaria. Type in Munich.

Note. It is distinguished from *Bauhinia* by yellowish-orange corollas with reddish stripes on the outer side and somewhat dark stigmas.

The occurrence of this species in the flora of the Upper Dnieper Region (Novogrudok, former Minsk Province) is very doubtful, as one of its progenitors, *H. aurantiacum* L., does not grow there as a mountain plant. Nevertheless, W. Dybowski collected there not only a subspecies of *H. rubristylum* Rehm. but also a hybrid of the latter with *H. pilosella*, which Rehmann named *H. dybowskianum* Rehm. (*Verh. zool.-bot. Ges. Wien*, XLV, 346; *H. trigenes* N.P. *Hier. Mitteleur.* I, 659, ut synonyma; Fedtsch. and Flerow, *Fl. Evrop. Ross.* 1091). Type in Lvov?

Cycle 2. Arvicola Juxip.—*H. arvicola* = *H. florentinum-collinum* N.P. *Hier. Mitteleur.* I, 666, 834.—*H. florentinum-pratense* Zahn in Koch, *Synopsis*, 3, II (1901) 1749.—*H. arvicola* (N.P.) Zahn in Fedtsch. and Flerow, *Fl. Evrop. Ross.* (1910) 1091; Zahn, *Hier. fl. Mosquens.* 43.—*H. arvicola* N.P. = *H. florentinum-pratense* Zahn in *Pflzr.* IV, 280 (1923) 1474.—*H. piloselloides-pratense* Zahn in *Hegi. Ill. Fl.*, VI, 2 (1929) 1234; Asch. and Graebn. *Synopsis*, XII, I, 413.—Rhizome with sessile or stalked rosettes, or with short or only somewhat elongated, sometimes more or less underground stolons as in *H. pratense*, or with creeping or ascending runners and collateral stems; stem 30–60 cm high, hollow. Basal leaves lanceolate, more or less glaucous-green, somewhat stellate-pubescent only beneath; cauline leaves 2–4(–6). Inflorescence compact-paniculate, later becoming open, with 5–20(–40) capitula; acladium short, 4–6 mm. Involucres 5.5–8.5 mm long; involucre bracts mostly narrow, acute to subobtusate, dark to black, more or less with light border. Corollas and stigmas yellow.

In the range of *H. pratense* and *H. piloselloides*, i.e., in the western half of the European territory of the Soviet Union.

595. **H. arvicola** N.P. *Hier. Mitteleur.* I (1885) 672; Zahn, *Hier. fl. Mosquens.* 44; *Pflzr.* IV, 280, 1477; Asch. and Graebn. *Synopsis*, XII, I, 416, sub *H. eu-arvicola* (N.P.) Zahn; Syreistsch. *Fl. Mosk. Gub.* III

(1910) 359.—Exs.: Hier. Naeg. No. 300; Zahn, Hier. Europ. Nos. 537, 537a; GRF Nos. 1253, 1806.

Perennial. Stem 30–60 cm high; 1.5–2.0 mm in diameter, in lower part with scattered, light-colored hairs 2–3 mm long and above with occasional dark hairs, above with sparse, quickly thinning glands, distinctly stellate-pubescent; stolons absent. Basal leaves 3–9, outer spatulate, obtuse to lanceolate, subacute to acute, to 13 cm long (10–11:1), glabrous above or toward margin with occasional hairs 1.5–3.0 mm long with sparse hairs to 4 mm long beneath along midrib, sparsely
518 stellate-pubescent beneath, only along midrib above; cauline leaves 2–4 (coefficient of leafiness 0.06). Inflorescence openly paniculate, with 3–35 capitula; peduncles with very sparse, hairs 1–2 mm long, and to sparsely glandular, more or less grayish from down; floral bracts gray to dark. Involucres (6.0)6.5–7.5 mm long, cylindrical; involucre bracts narrow, subobtuse, black, scarcely bordered, with occasional, 8(3–12), hairs 2 mm long and sparse, 14(12–16), glands 0.4–0.5 mm long, scatteredly stellate-pubescent. Stigmas yellow. Flowering June to July. (Plate XXXV, Fig. 2.)

Meadows and forest edges, old fields.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Volga, Volga-Don, Upper Dniester. *General distribution*: Central Europe. Described from vicinity of Munich. Type in Munich.

Note. Apparently, *H. leucocraspedum* Peter (*Nachr. K. Ges. Wiss. Götting.* 2, 78; Zahn, *Hier. fl. Mosquens.* 44; *Pflzr.* IV, 280, 1478) should be included under this species; it is distinguished by very short, thickish underground stolons and with distinctly bordered involucre bracts.—*European Part*: Dvina-Pechora, Upper Volga. Endemic? GRF No. 2204a, b, c. Type is in Leningrad.

596. **H. curvulum** Norrl. *Nya nord. Hier.* I (1904) 77; Mela-Cajander, *Suom. Kasvio* (1906) 654; Zahn in *Pflzr.* IV, 280, 1476.—Exs.: Norrl. *Hier. exs. fasc.* IV, Nos. 25–26.

Perennial. Stem 40–60 cm high, 1.5 mm in diameter, flexuous, at base violet, with occasional hairs 1–3 mm long, and above with occasional glands; stolons absent (or sometimes underground). Basal leaves 5–6 obovate, rounded-obtuse, to 8 cm long, spatulate, lingulate to narrowly lanceolate (12:1) and acute, glaucescent, glabrous above, along margin and beneath along midrib with occasional to sparse hairs 1.0–2.5 mm long, with stellate down beneath along midrib; cauline leaves 2–4 (coefficient of leafiness 0.06), narrowly lanceolate and acute. Inflorescence paniculate, with 10 capitula; peduncles with occasional hairs and glands, scatteredly stellate-pubescent. Involucres 6–7 mm long, cylindrical; involucre bracts somewhat narrow, acute, dark, with

white border, with occasional (4) hairs 1.5 mm long and also occasional (8) glands 0.5 mm long, almost without stellate down. Corollas light yellow, tips of peripheral florets dirty green; stigmas yellow. Flowering June to July.

Dry sandy places.—*European Part*: Ladoga-Ilmen. *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki; paratype in Leningrad.

597. **H. assimilatum** Norrl. Anteckn. öfv. Finl. Pilosel. I (1884) 151; N.P. Hier. Mitteleur. I, 672; Mela-Cajander, Suom. Kasvio. 655; Zahn in Pflzr. IV, 280, 1476.—*Pilosella assimilata* Norrl. Herb. Pilos. Fenn. (1884) No. 81.

519 Perennial. Stem 50 cm high, 1.5–2.0 mm in diameter, sulcate, at base rather dense, light-colored bristles 2.0–2.5 mm long, thinning upward, bristles sparse and black above, with sparse glands above, scatteredly stellate-pubescent, stolons absent or sometimes somewhat short. Basal leaves spatulate to lanceolate, outer obtuse, others acute, glaucescent, more or less glabrous and only along margin with sparse bristles 1–2 mm long, but scatteredly setose beneath along midrib, sparse to scattered stellate down only beneath along midrib (and margin); cauline leaves 2–3 (coefficient of leafiness 0.05). Inflorescence openly paniculate, with 7–20 capitula; peduncles glabrous, with occasional to scattered glands, grayish from down; floral bracts gray, with light-colored border. Involucres 6.5–7.5 mm long, cylindrical; involucre bracts narrow, acute, blackish, scarcely bordered, with sparse, black hairs 1 mm long, sparsely to scatteredly glandular, scatteredly stellate-pubescent. Corollas dark yellow; stigmas yellow. Flowering June to July.

Hillsides and meadows.—*European Part*: Karelia-Lapland, Dvina-Pechora (western part). *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki.

Note. *H. hirtulum* Peter (*Nachr. K. Ges. Wiss. Götting.* 1, 78; Zahn, *Hier. fl. Mosquens.* 1911, 43; Pflzr. IV, 280, 1475) should be included here; it is distinguished by sparse, short, pubescence over the whole plant (peduncles and involucre bracts glabrous or with sparse hairs in var. *pilosius* Peter). It is found in Dvina-Pechora and Upper Volga regions. Endemic? Described from the vicinity of Moscow (GRF No. 1251, sub *H. acrocomum* ssp. *floribundiforme*).

598. **H. apatorium** N.P. Hier. Mitteleur. I (1885) 674; Zahn in Pflzr. IV, 280, 1476.—**Exs.**: GRF No. 1805, sub var. *subspathophyllum* Zahn in Sched. ad HFR VI (1908) 77.

Perennial. Stem 20–35 cm high, 1.5–2.0 mm in diameter, with scattered light-colored hairs 3 mm long at base, 2 mm long above, in variety

(var. *subspathophyllum* Zahn) entirely glabrous, above with occasional glands, scatteredly stellate-pubescent, down decreasing downward; stolons somewhat elongated, thickish or almost always undeveloped (in [above] variety). Basal leaves 3–6, lanceolate, subobtuse to acute (9.5:1), glaucescent, with occasional hairs 1 mm long only along margin and midrib, without stellate down; cauline leaves 2–3 (coefficient of leafiness 0.08). Inflorescence openly paniculate, with 5–15 capitula, with remote lower branch; peduncles with scattered hairs and with occasional glands, gray-tomentose; floral bracts gray. Involucres 5.5–6.0 mm long, cylindrical; involucral bracts narrow, subobtuse, dark, with light-colored border and sparse, light-colored hairs 1 mm long or almost glabrous (var. *subspathophyllum* Zahn), with scattered, 13(10–14), glands to 1 mm long, and scattered stellate down. Flowering June.

Riverbanks.—*European Part*: Ladoga-Ilmen. *General distribution*: Central Europe. Described from Bavaria (Munich, from natural hybrid). Type in Munich (type of variety in Leningrad).

520 **Note.** Only the variety is found in the USSR.

599. **H. erythrochristum** N.P. Hier. Mitteleur. I (1885) 668; Zahn, Hier, fl. Mosquens. 43; Pflzr. IV, 280, 1475; Asch. and Graebn. Synopsis, XII, I, 413.

Perennial. Stem 40–45 cm high, 2–3 mm in diameter, with scattered to sparse, light-colored bristles 2–3 mm long at base, hairs dark above, with sparse glands above, decreasing downward, scatteredly stellate-pubescent; stolons absent. Basal leaves lanceolate, subobtuse to acute, glaucescent, above or toward margin with sparse to occasional bristles 3 mm long, on both sides stellate-pubescent: above very sparsely, beneath sparsely; cauline leaves 2 (coefficient of leafiness 0.04). Inflorescence very openly paniculate, with remote lower branches, with 10–15 capitula; peduncles somewhat thick, with sparse hairs or entirely glabrous, barely scatteredly glandular, grayish-tomentose; floral bracts dark. Involucres 6–7 mm long, cylindrical; involucral bracts narrow, subobtuse, dark, with wide, light green border and occasional, light-colored hairs 1.5 mm long or entirely glabrous, to moderately glandular and scatteredly stellate-pubescent. Corollas yellow; peripheral ones reddish at tip outside. Flowering June to July.

Grassy places and meadows.—*European Part*: Upper Volga. *General distribution*: Central Europe. Described from Bavaria. Type in Munich.

Cycle 3. Leptoclada Juxip.—*H. leptoclados* and *H. arvicola* + *Pilosella* N.P. Hier. Mitteleur. I (1885) 675, 832.—*H. arvicola-pilosella*



Plate XXIX.

1—*H. apatelium* N.P.; 2—*H. retroversilobatum* Schelk. and Zahn.

Zahn in Pflzr. IV, 280 (1923) 1479; Asch. and Graebn. Synopsis, XII, I, 420.—Differs from *H. arvicola* N.P. by having stolons with dense and rather large leaves, leaves and involucre bracts that are strongly stellate-pubescent beneath, spreading-paniculate inflorescence with long (30–80 mm long) acladium, and small number (3–8) of capitula.

The influence of the polymorphic *H. pilosella* L. is seen also in the highly variable proportions of the pubescence types and the glandularity of all the parts (involucre bracts, peduncles and stem).

600. ***H. leptoclados*** N.P. Hier. Mitteleur. I (1885) 675, 832; Zahn in Fedtsch. and Flerow., Fl. Evrop. Ross. 1091; Zahn in Pflzr. IV, 280, 1479; Asch. and Graebn. Synopsis, XII, I, 421, sub *H. euleptoclados* Zahn.—Exs.: Hier. Naeg. Nos. 108, 134.

523 Perennial. Stem 10–30 cm high, 1–2 mm in diameter, hollow, moderately covered at base with light-colored hairs, 3–5 mm long, thinning upward, scatteredly to moderately glandular above, glands decreasing downward, densely stellate-pubescent throughout to tomentose above; stolons short to moderately long, with many, rather large leaves. Basal leaves 2–5, obovate to lanceolate, mostly acute, glaucescent, with scattered bristles 4–6 mm long on both sides, 3–4 mm long along margin, with stellate down beneath to hyaline-tomentose; cauline leaves 1(–2) (coefficient of leafiness 0.08). Inflorescence openly paniculate to shallowly dichotomous, with 3–8 capitula; acladium 30–80 mm long; peduncles with moderate hairs and scattered glands, tomentose; floral bracts gray. Involucres 7.5–8.5 mm long, cylindrical, later subglabrous; involucre bracts somewhat broad, acute, dark or gray, with inconspicuous light-colored border, with scattered, light-colored hairs 1.5 mm long and to scatteredly glandular, with very dense stellate down. Corollas yellow, sometimes peripheral ones with red stripes. In habit, resembles *H. leptophyton* N.P.

Meadows and grassy places.—*European Part*: Dvina-Pechora, Upper Volga. *General distribution*: Central Europe. Described from Bavaria. Type in Munich.

Cycle 4. Obornyana Juxip.—*H. oborryanum* N.P. Hier. Mitteleur. I (1885) 711, 837.—*H. collinum* + *magyaricum* N.P. l. c.—*H. bauhini-pratense* Zahn in Koch, Synopsis, 3, II, (1901) 1752; Pflzr. IV, 280, 1482; Asch. and Graebn. Synopsis, XII, I, 422.—Differs from members of subsection *Bauhinia* by having more or less dense and long hairs on all parts and thicker stem; stem and leaves more or less setose.

According to Zahn (*Fl. Evrop. Ross.* 1091), it should be found in the European territory of the Soviet Union. However, until now, except for the Upper Dniester Region, it has not been reported. Naegeli and

Peter (l. c.) attribute the rarity of this hybrid it being overlooked because of its similarity to the species of *Bauhinia*.

601. **H. obornyanum** N.P. Hier. Mitteleur. I (1885) 712; Zahn in Pflzr. IV, 280, 1483; Asch. and Graebn. Synopsis, XII, I, 423.—**Exs.:** Hier. Naeg. Nos. 260, 271; Fl. exs. Austr.-Hung. No. 3055; Baenitz, Herb. Europ. No. 5238; Zahn, Hier. Europ. No. 732.

Perennial. Stem 40–70 cm high, 2–3 mm in diameter, with more or less dense, light-colored, hairs 2–3(–4) mm long with black base, thinning upward, and scattered dark hairs above, glands sparse above thinning downward, more or less densely stellate-pubescent; stolons very long, thin, with remote, small or medium-sized leaves. Basal leaves 2–6, lanceolate to narrowly-lanceolate, obtuse to subacute, to 14 cm long (8–12:1), yellowish-green or glaucescent, on both sides moderately covered with bristles 1.5–2.5 mm long, scatteredly stellate-pubescent beneath, above only along midrib and, that, very sparsely so; cauline leaves 2–3(–5) (coefficient of leafiness 0.05). Inflorescence openly paniculate, with 10–20 capitula; acladium 6–8 mm long; peduncles scatteredly pubescent and likewise glandular, grayish from stellate down; floral bracts dark, with light border. Involucres (7.0–)7.5–8.5 mm long, cylindrical; involucral bracts narrow, acute, blackish, with light border, with sparse, 14(10–16), light-colored hairs 1.5–3.0 mm long, and scattered, 21(15–32), glands 0.5 mm long, scatteredly stellate-pubescent. Corollas dark yellow, sometimes with reddish tips of teeth; stigmas yellow. Flowering June to July.

Grassy places.—*European Part:* Upper Dniester. *General distribution:* Central Europe. Described from Austria. Type in Munich.

Cycle 5. Acrothyrsa Juxip.—*H. acrothyrsus* N.P. Hier. Mitteleur. I (1885) 714, 873.—*H. pilosella-collinum-magyaricum* N.P. l. c.—*H. bauhini-pratense-pilosella* Benz in Oester. Bot. Zeitsh. LII (1902) 26.—*H. obornyanum-pilosella* Zahn in Pflzr. IV, 280, 1484; Asch. and Graebn. Synopsis, XII, I, 425.—*H. lobarzewskii* Rehm. in Verh. zool.-bot. Ges. Wien. XLVII (1897) 305.—*H. magyaricum-floribundum* Rehm. Ibid.—*H. bauhini-floribundum* Zahn in Pflzr. l. c.; Asch. and Graebn. Synopsis, op. cit. p. 426.—Long stolons with small leaves resembling *Bauhinia*, but habit and pubescence of *Pratensina*. Rare species found so far in southwestern areas.

602. **H. acrothyrsus** N.P. Hier. Mitteleur. I (1885) 714, 837; Zahn in Pflzr. IV, 280, 1484; Asch. and Graebn. Synopsis, XII, I, 425.—*H. altefurcatum* Rehm. in Verh. zool.-bot. Ges. Wien. XLVII (1897) 307

(ut ssp. *H. acrochyrso*).—*H. percurvans* Zahn in Pflzr. l. c. (ut ssp. *H. acrothyrso*).

Perennial. Rhizome oblique, very short, thick; stolons above-ground, long, thin, with remote small leaves, gradually decreasing toward top; stem 20–40 cm high, thin, hollow, slightly sulcate, pubescence at base scattered, with hairs 1–2(–4) mm long, above hairs sparse and dark, glands scattered above, thinning almost to base, stellate pubescence dense in upper part, quickly thinning downward. Basal leaves 4–6, elliptical to lanceolate, obtuse to acute (to 7 cm long), glaucescent, pubescence above scattered, bristles 2–3 mm long, stellate pubescence mainly beneath along midrib; cauline leaves 0–1 (coefficient of leafiness 0.02), at base of stem, stellate-pubescent beneath. Inflorescence openly paniculate, with 2–8, capitula; peduncles with occasional hairs, to densely glandular, gray-tomentose. Involucres (7)8–9(–10) mm long, ovate; involucre bracts narrow, subobtuse, dark, with light border, glabrous or sparsely (ssp. *altefurcatum* Rehm.), or rather densely (ssp. *percurvans* Zahn) pubescent, densely glandular, stellate down sparse (absent along margin). Stigmas yellow. Flowering June to July.

Grassy places, a very rare plant.—*European Part*: Upper Dniester (Lvov). *General distribution*: Central Europe. Described from Moravia. Type in Munich.

- 525 **Note.** Perhaps *H. lebarzewskii* Rehm. (*Verh. zool.-bot. Ges. Wien*. XLVII, 305; Zahn in Fedtsch. and Flerow, *Fl. Evrop. Ross.* 1093; *Pflzr.* IV, 280, 1484; Asch. and Graebn. *Synopsis*, XII, I, 426) should be included here as a synonym. Described from Lithuania and found in our southwestern regions, it is considered an intermediate species (or hybrid?) between *H. bauhini* Besser and *H. floribundum* Wimm. and Grab. (coll.). It is rare plant, apparently because its putative parents are antagonists: *H. bauhini* is a xerophyte, while *H. floribundum* is a mesophyte. The type may or may not be in Lvov.

Where *H. lobarzewskii* grows, its hybrid with *H. pilosella*—*H. pseudopiloselliflorum* Rehm. (l. c.)—is also found. It is distinguished by its shallowly dichotomous inflorescence with 2–5 capitula and involucres 9–10 mm long. Zahn treats *H. flagellatum* Zahn (*Pflzr.* IV, 280, 1485), described from Muratov (Orlov Region), as a subspecies of this species (*H. lobarzewskii*).

Subsection 6. Praealtoauriculina Juxip.—Plants of medium height (10–60 cm), very sparsely pubescent, with glands over the whole stem, scattered or sparse above and thinning downward; cauline leaves (1–)2–3(–4); inflorescence openly paniculate or strongly dichotomous, mostly with few capitula (2–30); in habit resembling weak specimens of *Praealtina*. Comparatively rare plants almost always found together

with the putative parents—xerophytes from section *Praealtina* and mesophytes from section *Auriculina*.

1. Inflorescence openly paniculate, with 5–30 capitula; acladium short (1–3% of length of stem); plant 20–60 cm high; involucre 6–8 mm long; leaves almost without stellate down; involucre bracts weakly stellate-pubescent.....2.
- + Inflorescence shallowly dichotomous, with 2–6 capitula; acladium longer (8–16% of the length of stem); plant 10–25 cm high; involucre 8–10 mm long; leaves gray-green beneath from stellate down; involucre bracts grayish from down; plant with very short, thickish stolons.....605. **H. paragogum** N.P.
2. Without stolons or very rarely with short, thin stolons; involucre bracts acute.....603. **H. sulphureum** Doell
- + Stolons elongated, somewhat thin, with leaves of almost equal size; involucre bracts obtuse or subobtuse (less frequently acute); stellate pubescence very sparse, only beneath along midrib.....604. **H. koernickeanum** N.P.

526 *Cycle 1. Sulphurea* Juxip.—*H. sulphureum* Doell. Rhien. Flora (1843) 521; Fl. Bad. II (1859) 863; ut *H. auricula* × *praealtum*; N.P. Hier. Mitteleur. I (1885) 648, ut *H. florentinum-auricula*; Zahn in Pflzr. IV, 280 (1923) 1467, etiam; Asch. and Graebn. Synopsis, XII, I (1930) 400, ut *H. piloselloides-auricula*.—Differs from *H. piloselloides* Vill. by lower height, fewer capitula in inflorescence; involucre bracts and floral bracts with white or light-colored margins; with rounded-spatulate, sparsely hairy outer basal leaves; stolons almost always absent or (very rarely) short and partly with rudimentary inflorescence; cauline leaves (1–)2(–4); inflorescence openly paniculate, acladium 6–15 mm long. Often is confused with weak specimens of *H. piloselloides* having few capitula.

603. **H. sulphureum** Doell, Rhein. Flora (1843) 521; Fl. Bad. II, 863; N.P. Hier. Mitteleur. I, 652; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1090; Zahn, Hier. fl. Mosquens. 45; Pflzr. IV, 280, 1468; Asch. and Graebn. Synopsis, XII, I, 401, ut *H. eu-sulphureum* Zahn.

Perennial. Stem 20–55 cm high, 1.0–1.5 mm in diameter, ascending or erect, with sparse hairs 1.0–2.5 mm long, above with sparse glands, thinning toward base, very sparsely stellate-pubescent, without or (very rarely) with short, thin stolons. Basal leaves 5–8, outer spatulate, rounded, inner lanceolate, obtuse to subacute, glaucous, pubescence very sparse, mostly only along margin and beneath along midrib with bristles 2–3 mm long, without stellate down beneath; cauline leaves

(1–)2(–4) (coefficient of leafiness 0.05). Inflorescence openly paniculate, with (5–)10–20 capitula; acladium 10 mm long; peduncles with occasional hairs, scattered glands, to gray-tomentose; floral bracts with bright whitish border. Involucres (6–)7.0–7.5(–8) mm long, ovate; involucral bracts narrow, acute, dark, with light border and sparse, light-colored hairs 1 mm long, moderately glandular, weakly stellate-pubescent. Corollas light yellow; stigmas yellow. Flowering June to July.

Grassy places.—*European Part*: Baltic Region, Upper Dniester. *General distribution*: Central Europe, Mediterranean Region. Described from Prussia. Type in Munich.

Note. *H. sulphureum* Doell is considered the hybrid of *H. piloselloides-auricula* and grows together with both parents. Its occurrence is quite rare, which perhaps is explained by the difference in the ecology of its parents: xerophytic *H. piloselloides* and mesophytic *H. auricula*, and also by the difference in their flowering time (*H. auricula* flowers earlier than *H. piloselloides*). Zahn (*Hier. fl. Mosquens.* 1. c.) thinks that this species should be growing in the Moscow Region, but, apparently, its distribution is restricted to the western regions of our flora.

Cycle 2. Koernickeana Juxip.—*H. koernickeanum* N.P. Hier. Mitteleur. I (1885) 650, 828, sub *H. sulphureum*; Zahn in Koch, Synopsis, 3, II (1901) 1747; and *H. bauhini* × *auricula*: Pflzr. IV, 280 (1923) 1469 and *Bauhini-auricula* Zahn; Asch. and Graebn. Synopsis, XII, I, 403.—Differs from *H. sulphureum* by elongated, somewhat thin stolons with rather large, more or less equal-sized leaves or larger ones toward the tip. Rare plants, mostly associated with their parents.

- 527 604. **H. koernickeanum** N.P. Hier. Mitteleur. I (1885) 650; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1090; Pflzr. IV, 280, 1470; Asch. and Graebn. Synopsis, XII, I, 404.

Perennial. Stem 25–60 cm high, more or less thin, with very sparse hairs 1–2 mm long, mostly concentrated near base, above with sparse glands, thinning downward, and very sparse stellate down; stolons long, more or less thin, with leaves of almost equal size. Outer basal leaves spatulate, rounded, inner lanceolate, subobtuse to acute, glaucous, very sparsely pubescent along margin toward base and beneath along midrib with bristles 1.0–2.5 mm long, stellate pubescence very sparse, only beneath along midrib or completely absent; cauline leaves (1–)2–3 (coefficient of leafiness 0.05), in lower half of stem. Inflorescence compactly or openly paniculate (with umbellate tip), with 6–30 capitula; acladium 5–10 mm long; peduncles usually glabrous (or

sometimes with occasional hairs), moderately glandular, gray-tomentose; floral bracts gray, with border light or light-colored (ssp. *samoviae* N.P.) or dark (ssp. *denigratum* N.P.). Involucres 7–8 mm long, ovate; involucre bracts mostly narrow, obtuse or subacute, less often somewhat broad and acute (ssp. *samoviae* N.P.), black or dark, narrowly light-bordered, with occasional to sparse, dark hairs 1.0–1.5 mm long or without them (ssp. *gumbinnense* N.P.), with scattered to moderate glands and very moderate stellate down. Corollas light yellow; stigmas yellow. Flowering June to July.

Grassy places, mountains up to 1,200 m; rare plant.—*European Part*: Baltic Region, Ladoga-Ilmen(?), Upper Volga, Upper Dniester. *General distribution*: Central Europe (eastern part). Described from St. Petersburg (apparently, on the basis of specimens from the Botanical Garden). Type in Munich.

Cycle 3. Paragoga Juxip.—*H. paragogum* N.P. Hier. Mitteleur. I (1885) 653, 828.—*H. brachiatum-auricula* Zahn in Pflzr. IV, 280 (1923) 1470; Asch. and Graebn. Synopsis, XII, I, 405.—Stem 10–25 cm high; stolons short, somewhat thickish, with rather large, crowded leaves. Leaves spatulate to lanceolate, glaucous, with rare bristles along margin, beneath gray-green from stellate down; cauline leaves 1. Inflorescence openly paniculate, with very remote branches, 2–4(–6) capitula. Involucres 8–10 mm long; involucre bracts grayish from stellate down. Very rare.

605. **H. paragogum** N.P. Hier. Mitteleur. I (1885) 653; Zahn in Hier. fl. Mosquens. 45; Pflzr. IV, 280, 1471; Asch. and Graebn. Synopsis, XII, I, 406, sub *H. eu-paragogum* (N.P.) Zahn.—**Ис.**: Syreistsch. Fl. Mosk. Gub. III (1910) 359.—**Exs.**: Hier. Naeg. No. 107.

528 Perennial. Stem 10–25 cm high, thin, with sparse, light-colored hairs 2.0–3.5 mm long, with glands scattered above, thinning toward base, densely stellate-pubescent above; stolons very short, somewhat thick, with rather large, crowded leaves. Basal leaves 5–10, more or less spatulate, obtuse to lanceolate, subobtuse or acute, glaucous, very sparsely covered along margin with bristles 2–4 mm long, gray-green beneath from stellate down; cauline leaves 1 (coefficient of leafiness 0.06). Inflorescence shallowly dichotomous or openly paniculate with highly divergent branches, with 2–6 capitula; peduncles glabrous, with up to dense small glands, gray-tomentose; floral bracts light-colored or gray. Involucres 8–10 mm long, ovate or subglobose; involucre bracts narrow, acute, light gray, with pale green border, glabrous, with dense small glands, grayish from stellate down reaching to margin.

Corollas light yellow, sometimes tips of ligules reddish; stigmas yellow. Flowering June to July.

Grassy places.—*European Part*: Upper Volga, Upper Dniester. *General distribution*: Central Europe. Described from Bavaria. Type in Munich.

Note. Apparently, the following Galician species should be included under this species: *H. pantepsilon* Rehm. (*Vestn. zool.-bot. Ges. Wien*, XLV. 1895, 339; *Engl. Pflzr.* IV, 280, 1470), distinguished by long glands, green floral bracts, exceedingly sparse pubescence, only at base of leaves, and somewhat broad involucre bracts, and *H. paragogiceps* Zahn (*Pflzr.* IV, 280 = *H. paragogiforme* Oborny, *Hier. Mähr.* (1905) 110; nec Besse and Zahn) having elongated, partly underground stolons or without stolons.

Subsection 7. *Praealtopilosellina* Juxip.—In habit resembling *Bauhinia*, all [plants] with long, thin stolons; inflorescence openly paniculate or shallowly or deeply dichotomous, with few, (1–)2–12 (–20), capitula; stellate pubescence rather conspicuous; leaves to densely pubescent beneath, cauline leaves 0–1(2–4); peripheral florets often with red stripes outside.

1. Inflorescence openly paniculate, with 2–12(–20) capitula.....2.
- + Inflorescence shallowly or deeply dichotomous, with 0(1–) 2–6 capitula.....11.
2. Peripheral florets on outside (almost always) without red stripes; stellate pubescence of plant (particularly of involucre bracts) sparse to barely scattered (cycle *Leptophyta*).....3.
- + Peripheral florets on outside (almost always) with more or less dark purple stripes; stellate pubescence of plant conspicuous, involucre bracts in particular grayish from down (cycle *Tephrocephala*).....8.
3. Involucre bracts with hairs.....4.
- + Involucre bracts glabrous but densely glandular; involucre 7.5–8.0 mm long.....611. ***H. leptophytum*** N.P.
4. Glands on involucre bracts 0.4–0.6 mm long.....5.
- 529 + Glands on involucre bracts very small, 0.2 mm long and occasional; stem, stolons and peduncles very thin.....610. ***H. bauhiniflorum*** N.P.
5. Peripheral florets without red stripes.....6.
- + Peripheral florets on outside somewhat red-colored.....7.
6. Involucre 4.5–5.0 mm long, sparsely glandular; plants of Caucasus.....606. ***H. micro-bauhini*** Zahn

- + Involucres 6.5–7.0 mm long; moderately glandular.....607. **H. anocladum** N.P.
- 7. Involucres 5–6 mm long; involucral bracts with sparse hairs; tips of peripheral florets reddish.....608. **H. subbauhiniflorum** Woron. and Zahn
- + Involucres 8.0–8.5 mm long; involucral bracts moderately hairy; peripheral florets on outside with red stripes.....609. **H. discolor** N.P.
- 8 (2). Involucral bracts somewhat broad (1.5 mm wide).....9.
- + Involucral bracts narrow (1 mm wide), to sparsely pubescent; stems reddish.....621. **H. christoglossum** Zahn
- 9. Floral bracts with lighter (greenish) border.....10.
- + Floral bracts with purple border; ligules with dark purple stripes; acladium to 20 mm long; inflorescence with 2–5 capitula.....624. **H. purpureibracteum** Zahn
- 10. Inflorescence more or less compact, pseudo-umbellate, with up to 20 capitula; acladium 12 mm long; involucral bracts with occasional glands.....622. **H. subrubellum** Schelk. and Zahn
- + Inflorescence openly paniculate, with 3–5(–10) capitula; acladium 20–50 mm long; involucral bracts sparsely glandular.....623. **H. purpureovittatum** Zahn
- 11 (1). All florets tubular.....612. **H. tubuliflorum** N.P.
- + All florets ligulate.....12.
- 12. Basal leaves densely stellate-pubescent beneath (grayish) (cycle *Bracchiata*).....13.
- + Basal leaves below scatteredly (to moderately) stellate-pubescent; plants of mountain zones of Crimea and Caucasus (cycle *Ruprechtia*).....20.
- 13. Inflorescence shallowly dichotomous.....14.
- + Inflorescence mostly deeply dichotomous.....17.
- 14. Involucral bracts glabrous or with occasional dark hairs.....15.
- + Involucral bracts with light-colored, sparse to scattered hairs 2–3 mm long, plants of Caucasus.....16.
- 15. Involucral bracts glabrous; plants of Caucasus.....613. **H. psilobrachion** Woron. and Zahn
- + Involucral bracts with occasional dark hairs. Plants of European territory of Soviet Union.....614. **H. ilyassowoënsë** Zahn
- 530 16. Involucral bracts with occasional glands and scattered (30–35) hairs.....615. **H. lenkoranense** Juxip
- + Involucral bracts with sparse to scattered (20–30) glands, sparsely (20) hairy.....616. **H. nalczikense** Juxip
- 17 (13). Involucral bracts with moderate to scattered glands.....18.
- + Involucral bracts with sparse to occasional glands.....19.

18. Involucral bracts with moderate glands; stem 10–20 cm high.....618. **H. dmitrovense** Peter
 + Involucral bracts with sparse to scattered glands; stem 15–35 cm high.....620. **H. pseudobrachiatum** (Čel.) N.P.
19. Glands on involucral bracts sparse; stem 35–55 cm high; acladium 1/20 to 1/2 as long as stem; floral bracts gray-green.....617. **H. alticaule** Litw. and Zahn
 + Glands on involucral bracts occasional; stem 13–17 cm high; acladium 1/2 to as long as stem; floral bracts dark.....619. **H. matrense** N.P.
- 20 (12). Involucral bract glabrous, narrow, and subacute.....625. **H. tuscheticum** Zahn
 + Involucral bracts with significant number of hairs.....21.
21. Involucral bracts moderately hairy, somewhat broad, subobtusely; involucre 6–7 mm long.....626. **H. jailanum** Zahn
 + Involucral bracts rather densely hairy.....22.
22. Involucres 7–8 mm long; involucral bracts somewhat broad, subacute; endemic to Crimea.....627. **H. tephropodum** Zahn
 + Involucres 9–10 mm long; involucral bracts somewhat narrow, acute; endemic to Caucasus.....628. **H. ruprechtii** Boiss.

Cycle 1. Leptophyta Juxip.—*H. bauhini* > *pilosella* Zahn in Koch, Synopsis, 3, II (1901) 1746; Pflzr. IV, 280, 1460; Asch. and Graebn. Synopsis, XII, I, 389.—*H. leptophyton-magyaricum* > *pilosella* N.P. Hier. Mitteleur. I (1885) 642, 827.—Stem 13–50 cm high, thin like stolons and peduncles; in habit resembling *H. bauhini* Bess. coll. but differing from the latter by openly paniculate to shallowly dichotomous inflorescence with 3–12 capitula and leaves sparsely to rather densely stellate-pubescent beneath; involucre 4.5–8.5 mm long; involucral bracts mostly narrow; stigmas yellow; peripheral florets mostly without red stripes, less often with weak tint. Found together with species of subsection *Bauhinia*.

606. **H. micro-bauhini** Zahn in Fedde, Repert. III, (1907) 185; Zahn in Pflzr. IV, 280 (1923) 1464.

Perennial. Stem 13–17 cm high, thin, sparsely hairy and sparsely glandular; stolons thin. Basal leaves spatulate to narrowly lanceolate, often small, with sparse bristles, scatteredly stellate-pubescent beneath; cauline leaves 1 (coefficient of leafiness 0.07). Inflorescence
 531 openly paniculate, with 7–10 capitula; acladium 20 mm long; peduncles sparsely pubescent and with sparse glands and sparse stellate down. Involucres 4.5–5.0 mm long; involucral bracts somewhat broad, with wide green border, sparsely pubescent and sparsely glandular, with

sparse stellate down. Peripheral florets on outside without stripes. Flowering June to July.

Mountains, middle montane zone, at 1,740–1,920 m.—*Caucasus*: Dagestan. Endemic. Described from banks of Samura River in Dagestan (collected by Ruprecht). Type unknown.

Note. The following Galician species are very similar to it: *H. nematoclados* Rehm. (*Verh. zool.-bot. Ges. Wien.* XLV, 1895, 342; *Pflzr.* IV, 280, 1464) and *H. approximabile* Zahn (= *H. approximatum* Rehm. op. cit. 343; *Pflzr.* l. c.). Type in Lvov?

607. **H. anocladum** N.P. Hier. Mitteleur. I (1885) 644; Zahn in *Pflzr.* IV, 280, 1464; Asch. and Graebn. Synopsis, XII, I, 396.—**Exs.:** Zahn, Hier. Europ. No. 533.

Perennial. Stem 15–40 cm high, slender, with occasional hairs 2–3 mm long, with sparse glands thinning upward, scatteredly stellate-pubescent; stolons long, thin. Basal leaves lanceolate, acute, glaucous, above toward margin with sparse or occasional bristles 2–3 mm long, sparse to moderate (f. *normale* Zahn) stellate down beneath or almost without it (f. *calvifolium* Zahn); cauline leaves 1–2 (coefficient of leafiness 0.06), upper leaf very small. Inflorescence openly paniculate, with 4–10 capitula; acladium 30 mm long; peduncles thin, with occasional hairs, moderately glandular, gray-tomentose; floral bracts dark, with light border or light-colored. Involucres 6.5–7.0 mm long, ovate; involucre bracts narrow, acute, dark, slightly light-bordered with occasional to scattered, light-colored hairs 0.5–2.0 mm long, moderately glandular, with scattered stellate down. Peripheral florets on outside without stripes. Flowering June to July.

Grassy and stony places.—*European Part*: Baltic Region, Upper Dniester, Crimea. *General distribution*: Central Europe, Balkans-Asia Minor (western part). Described from Prussia. Type in Munich.

608. **H. subbauhiniflorum** Woron. and Zahn in *Vestn. Tifl. Bot. Sada*, 12 (1908) 4; Zahn in *Pflzr.* IV, 280, 1462.

Perennial. Stem to 50 cm high, sparsely hairy, in upper part sparsely glandular and scatteredly stellate-pubescent; stolons thin. Basal leaves narrowly lanceolate, barely or to sparsely setose, bristles 2.5 mm long, somewhat stellate-hairy beneath; cauline leaves 1 (coefficient of leafiness 0.04). Inflorescence openly paniculate, with up to 12 capitula; acladium 20 mm long; peduncles with sparse hairs and sparse glands, gray-tomentose. Involucres 5–6 mm long; involucre bracts narrow, with sparse hairs and equally sparse glands, scatteredly stellate-pubescent. Tips of peripheral florets reddish. Flowering June to July.

- 532 *Caucasus*: Western Transcaucasia. *General distribution*: Balkans-Asia Minor (Armenia). Endemic. Described from Abkhazia. Type unknown.

609. **H. discolor** N.P. Hier. Mitteleur. I (1885) 646; Zahn in Pflzr. IV, 280, 1462; Asch. and Graebn. Synopsis, XII, I, 392.

Perennial. Stem 20–30 cm high, thin, almost glabrous or with sparse, light-colored hairs 2–3 mm long, above with occasional glands, quickly thinning downward, scatteredly stellate-pubescent; stolons long, thin. Basal leaves lanceolate, subacute, glaucous, on both sides with sparse hairs, above with bristles 3–4 mm long, with softer hairs beneath, along midrib scatteredly hairy, with stellate pubescence beneath to gray-green; cauline leaves 1 (coefficient of leafiness 0.04). Inflorescence openly paniculate, with 3–5 capitula; acladium 6–12 mm long; peduncles with occasional hairs and sparse glands, gray-tomentose; floral bracts whitish. Involucres 8.0–8.5 mm long, ovate; involucre bracts somewhat broad, subacute, black, with wide whitish border, with moderate black hairs 1.5–2.0 mm long, scatteredly glandular, with scattered stellate down. Peripheral florets on outside with red stripes, rarely without. Flowering June to July.

Grassy dry places.—*European Part*: Upper Dniester; *Caucasus*: Western Transcaucasia. *General distribution*: Central Europe. Described from Silesia. Type in Munich.

Note. Its occurrence in Khula (Adzharia), reported by Zahn, is extremely noteworthy because of the disjunction from the main range.

610. **H. bauginiflorum** N.P. Hier. Mitteleur. I (1885) 646; Zahn in Pflzr. IV, 280, 1463; Asch. and Graebn. Synopsis, XII, I, 394.—*Exs.*: Zahn, Hier. Europ. Nos. 534, 629.

Perennial. Stem 30–40 cm high, very thin, with scattered, light-colored hairs 1.0–2.5 mm long, eglandular, scatteredly stellate-pubescent; stolons long, very thin. Basal leaves (2) lanceolate to narrowly lanceolate, acute, to 9 cm long, glaucescent, above with scattered, bristles 1–2 mm long, stellate pubescence beneath sparse to rather profuse; cauline leaves 2 (coefficient of leafiness 0.07). Inflorescence shallowly dichotomously paniculate, with 3–6(–12) capitula; acladium 35–90 mm long; peduncles very thin, sparsely hairy, with occasional glands, quickly thinning downward, gray from thinning down; floral bracts light-colored. Involucres 6.0–6.5 mm long, cylindrical; involucre bracts very narrow, acute, dark gray, with greenish border with moderate, light-colored hairs 1.0–2.5 mm long and occasional, glands 0.2 mm long, scatteredly stellate-pubescent. Florets dark yellow;

peripheral florets on outside without stripes or sometimes with weak stripes. Flowering June to July.

Dry grassy places.—*European Part*: Baltic Region (southern part), Crimea; *Caucasus*: Eastern and Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor (eastern Anatolia). Described from Austria. Type in Munich.

- 533 611. ***H. leptophytum*** N.P. Hier. Mitteleur. I (1885) 644; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1089; Zahn, Hier. fl. Mosquens. 55; Pflzr. IV, 280, 1461; Asch. and Graebn. Synopsis, XII, I, 391, sub *H. eu-leptophyton* Zahn; Grossh. Fl. Kavk. IV (1934) 279.—**Exs.**: Hier. Naeg. No. 114; Baenitz, Herb. Europ. Nos. 5768, 6653; Zahn, Hier. Europ. Nos. 133, 223.

Perennial. Stem 20–50 cm high, thin, with occasional, light-colored hairs 1–2 mm long, above sparsely glandular (although occasional glands may reach almost to base of stem), densely stellate-pubescent; stolons elongated, thin (resembling those of *H. bauhini* Besser coll.). Basal leaves 4–8, lanceolate, acute, to 10 cm long (6–8:1), glaucous, with sparse bristles 2–4 mm long, with sparse stellate down below; cauline leaves 2 (coefficient of leafiness 0.06). Inflorescence openly paniculate, with 4–7 capitula; acladium 15–120 mm long; peduncles thin, glabrous or sometimes with occasional hairs (in more or less pubescent specimens), scatteredly glandular, gray-tomentose; floral bracts dark, with whitish border. Involucres (6.5–)7.5–8.0 mm long, ovate; involucre bracts narrow, acute, black, with whitish border, glabrous, moderately (50–65) glandular, glands 0.4–0.6(10) mm long, with scattered stellate down. Corollas light yellow, without stripes; stigmas yellow. Flowering June.

Dry grassy places.—*European Part*: Upper Dniester. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Hungary. Type in Munich.

Note. Zahn considers it probable that the range of this species reaches Central Russia. However, it is necessary to note that *H. leptophyton* apparently often is mixed with *H. auriculoides* Lang. One must also keep in mind the fact that Zahn considered *H. leptophyton* as a collective species.

The Galician species, *H. melanophilum* Rehm. (*Verh. zool.-bot. Ges. Wien*, XLV, 1895, 343; Pflzr. IV, 280, 1461), should be included in this species. Type in Lvov?

Cycle 2. *Brachiata* Juxip.—*H. florentinum* < *pilosella* Zahn, Hier. Schweiz (1906) 160; Pflzr. IV, 280, 1477; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1089; Pflzr. (l. c.); Asch. and Graebn. Synopsis, XII,

I, 365. —*H. collinum* Besser, Prim. fl. Galic. II (1809) 148 p. p.—*H. flagellare* Reichb. Fl. Germ. exc. (1830) 261.—*H. stoloniflorum* var. *collinum* Fr. Symb. (1848) 5 and var. *campestre* Fr. Epicr. (1862) 13.—*H. bifurciforme* Litw. and Zahn, Pflzr. IV, 280 (1923) 1460.—Stem 10–55 cm high, above densely stellate-pubescent; stolons long, like those of *H. pilosella* (in suppressed or autumn specimens, often stolons may even be absent). Basal leaves beneath very densely stellate-pubescent to grayish; cauline leaves 0–1; inflorescence typically deeply dichotomous (less frequently shallowly dichotomous), with few
 534 (1–)2–6 capitula; peduncles tomentose. Involucral bracts mostly narrow (narrower than 1 mm), densely stellate-pubescent. Peripheral florets on outside with red stripes.

The species of this cycle occur within the limits of the range of subsections *Florentina* and *Bauhinia*; they are quite common there and, furthermore, often in large numbers. As a result of the high polymorphism of their parents (*Florentina*, *Bauhinia* and *H. pilosella* L. coll.), all “brachiate” forms are extremely variable. Since a large majority of the members of *Praealtina* and *Pilosellina* are of Central European origin, theoretically, it can be presumed that most forms of *Brachiata* are also concentrated in Central Europe. Only 27 of the 128 subspecies [segregate species] of *Brachiata* grow in the Soviet Union.

Given that the members of subsection *Florentina* differ from those of subsection *Bauhinia*, in essence only by the presence or absence of stolons, it is impossible to differentiate the forms *Florentina* < *pilosella* from those of *Bauhinia* < *pilosella* because both are “combinations” producing stoloniferous forms, and only a specially designed experiment can yield a definitive conclusion. In general, it can be said that in the intermediate forms of *Florentina* < *pilosella* a tendency toward the formation of ascending runners is observed, while in *Bauhinia* < *pilosella* the stolons often are very long and sometimes almost branch toward the end of summer. Because in our country species of *Bauhinia* predominate, theoretically, we may also expect a large number of brachiate forms from the combination *Bauhinia* < *pilosella*.

612. ***H. tubuliflorum*** N.P. Hier. Mitteleur. I (1885) 617; Zahn in Pflzr. IV, 280, 1450; Asch. and Graebn. Synopsis, XII, I, 370.—*H. collinum* Bess. Prim. fl. Galic. (1809) 148 p. p.

Perennial. stem 16 cm high, rather thin, with sparse hairs 2–3 mm long, occasional glands, and stellate hairs thinning downward; stolons elongated, rather thin. Basal leaves lanceolate, acute, glaucous, above toward margin with sparse bristles 2–3 mm long, scatteredly hairy

beneath and along midrib, grayish beneath from stellate down; cauline leaves 1 (coefficient of leafiness 0.06). Inflorescence shallowly dichotomous, with 2–3 capitula; acladium 10 mm long; peduncles sparsely hairy, moderately glandular, tomentose; floral bracts light-colored. Involucres 6.5–8.0 mm long, cylindrical, later ovate; involucre bracts narrow, acute, dark, scarcely light-bordered, with light-colored, scattered hairs 1.5 mm long, and equally scattered glands, rather densely stellate-pubescent but margin glabrous. Florets tubular, on outside with red stripes. Flowering June to July.

Grassy and stony places.—*European Part*: Upper Dnieper. Endemic? Described from Volyn. Type in Berlin.

613. **H. psilobrachion** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 24; Pflzr. IV, 280, 1455.—*Exs.*: Woronow, Pl. Cauc. No. 5548.

535 Perennial. Stem to 30 cm high, sparsely hairy, flocculent from stellate down; stolons long, thin, in part runner-like. Basal leaves lanceolate, moderately setose with bristles 4–7 mm long, beneath densely stellate-pubescent; cauline leaves 0–1 (coefficient of leafiness 0.01). Inflorescence shallowly dichotomous, with 2–5 capitula; acladium 10 mm long; peduncles glabrous, scatteredly glandular, gray from down. Involucres 6–7 mm long; involucre bracts narrow, acute, glabrous, rather densely glandular, stellate-pubescent at base. Florets on outside with red stripes. Flowering June to July.

Mountains.—*Caucasus*: Western Transcaucasia. ?Endemic. Described from former Artvin District. Type unknown.

614. **H. ilyassowoëns** Zahn in HFR (1911) No. 1076; Pflzr. IV, 280, 1456.—*Exs.*: GRF No. 1076.

Perennial. Stem 35 cm high, with sparse bristles 3–4 mm long, sparsely glandular above, densely stellate-pubescent to base. Basal leaves short, obovate, obtuse to lanceolate and acute, sparsely setose above; cauline leaves 0–1 (coefficient of leafiness 0.01). Inflorescence shallowly dichotomous, with 4 capitula; acladium 35 mm long. Involucres 8 mm long; involucre bracts with occasional dark hairs, scatteredly to moderately glandular, moderately stellate-pubescent. Flowering June to July.

Grassy places.—*European Part*: Upper Volga. Endemic. Described from Zarsk District (Ryazan Region). Type in Leningrad.

615. **H. lenkoranense** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 529.

Perennial. Stem 10–25 cm high, thin, almost glabrous, with occasional glands above, stellate-pubescent over entire length, in upper

part pubescence to tomentose; stolons thin, half as long as stem, with remote small leaves, without stellate down above but tomentose beneath. Basal leaves (3–8) lanceolate, subacute, to 7 cm long (6:1), above and along margin with occasional hairs 3–2 mm long and beneath with sparse hairs 1.5 mm long, along midrib beneath with dense hairs 2.5 mm long, as a whole scatteredly pubescent, without stellate down above, scatteredly hairy beneath; cauline leaves 0–1, linear-lanceolate, small, in lower part of stem, without stellate down above, tomentose beneath. Inflorescence shallowly dichotomous, with 2–3 capitula; acladium 10–60% as long as stem. Involucres 7 mm long; involuclral bracts acute, with light border, with scattered (33) hairs 2 mm long, and occasional (6) glands 0.4 mm long, densely stellate-pubescent. Stigmas yellow. Achenes 2 mm long. Flowering June to July.

Caucasus: Talysh (Lenkoran District, village of Velya-Chyulya). Type in Baku.

Note. It is distinguished from the similar *H. psilobrachion* Woron. and Zahn by scatteredly pubescent involuclral bracts.

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616. *H. nalczikence* Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 530.

Perennial. Stem 20–30 cm high, 1.5 mm in diameter, sparsely pubescent (at base, hairs 5 mm long, in upper part shorter), with occasional glands above, scatteredly stellate-pubescent; stolons thin, to half as long as stem, with small lanceolate leaves to 2 cm long, without down above but tomentose beneath. Basal leaves 3–7, obovate to lanceolate, to 6 cm long (5:1), with scattered hairs 3 mm long above, densely hairy beneath and along midrib, with hairs 2.5 mm long, along margin with sparse hairs 2–5 mm long, as a whole moderately pubescent, without stellate down above but with scattered down beneath; cauline leaves small (coefficient of leafiness 0.04), linear-lanceolate, without stellate down above, densely pubescent beneath. Inflorescence shallowly dichotomous, with 2 capitula; acladium 15 mm long; peduncles with sparse hairs 2.5 mm long and occasional glands, tomentose. Involucres 8 mm long; involuclral bracts acute, with sparse, 20–25, hairs 2.5 mm long, and sparse, 20–30, glands 0.5 mm long, rather densely stellate-pubescent. Stigmas yellow.

Caucasus: Ciscaucasia (Nalchik). Type in Baku.

Note. It is distinguished from the similar *H. psilobrachion* Woron. and Zahn by hairy involuclral bracts.

617. *H. alticaule* Litw. and Zahn in Sched. HFR XLII (1906) 6; Fedde, Rept. III, 184; Pflzr. IV, 280, 1457.—**Exs.**: GRF No. 2064a, b.

Perennial. Stem 35–55 cm high, 1.0–2.5 mm in diameter, with scattered, light-colored hairs 3–4 mm long, eglandular, densely stellate down above, thinning downward; stolons elongated, thin, densely white-pubescent, slightly stellate-tomentose. Basal leaves 4–7, outer spatulate, obtuse, inner lanceolate, acute, to 11 cm long (4–6:1), glaucescent, on both sides sparsely setose, along margin and beneath along midrib more densely so with bristles 3–5 mm long, as a whole scatteredly setose, grayish beneath from stellate down; cauline leaves 0–1 (coefficient of leafiness 0.01), small. Inflorescence shallowly or deeply dichotomous, with 1–3(6) capitula; acladium 1/20 to 1/2 as long as stem; peduncles with sparse hairs with black base and sparse glands quickly thinning downward, gray-tomentose; floral bracts gray-green. Involucres 7–8 mm long, ovate; involucral bracts very slightly broad, acute, dark, with light green border, with up to scattered, 28(20–46), hairs 1.0–1.5(–3.0) mm long, and to sparse, 14(10–18), glands 0.3–0.5 mm long, scatteredly stellate-pubescent, but glabrous along margin. Florets on outside without stripes (extremely rarely with weak stripes); stigmas yellow. Flowering June to July.

Montane oak forests, at 1,250 m, in calcareous-stony places.—*Caucasus*: Ciscaucasia, Western Transcaucasia. Endemic. Described from Teberda. Type in Leningrad.

- 537 618. **H. dmitrovense** Peter in Nachr. K. Ges. Wiss. Götting. 2 (1893) 77; Zahn, Hier. fl. Mosquens. 42; Pflzr. IV, 280, 1456.

Perennial. Stem 10–20 cm high, thin sparsely hairy and in upper part sparsely glandular, grayish from stellate down. Basal leaves somewhat short, oblong to lanceolate, with sparse bristles 3–5 mm long, grayish beneath from down; cauline leaves 0–1 (coefficient of leafiness 0.03). Inflorescence dichotomous, with (1–)2 capitula; peduncles scatteredly pubescent, equally glandular, gray-tomentose. Involucres 7–9 mm long, ovate; involucral bracts scatteredly to moderately pale-hairy, moderately glandular, scatteredly stellate-pubescent. Peripheral florets on outside with somewhat reddish stripes. Flowering June to July.

Grassy places.—*European Part*: Upper Volga. Endemic? Described from Dmitrov District (Moscow Region). Type unknown.

619. **H. matrense** N.P. Hier. Mitteleur. I (1885) 632; Zahn in Pflzr. IV, 280, 1458; Asch. and Graebn. Synopsis, XII, I, 385.—**Exs.**: Zahn, Hier. Europ. No. 531.

Perennial. Stem 13–17 cm high, to 1 mm in diameter, with sparse hairs 2–3 mm long, dark above, light below, eglandular, rather densely stellate-pubescent throughout, gray above; stolons very thin. Basal leaves narrowly lanceolate, acute, glaucous, with sparse bristles 2–3

mm long above toward margin, grayish beneath from down; cauline leaves absent. Inflorescence deeply dichotomous, with 2 capitula; acladium half or almost as long as stem; peduncles sparsely to scatteredly hairy, with occasional glands, gray-tomentose; floral bracts dark. Involucres 7.0–7.5 mm long, ovate, later subglobose; involuclral bracts very narrow, acute, scatteredly to moderately pubescent with light-colored hairs 1 mm long, with occasional glands, gray from stellate down, glabrous along margin. Teeth of peripheral florets reddish. Flowering June to July.

Dry places, mountains.—*Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Hungary. Type in Munich.

Note. Since it was found in the former Artvin District, it may also be expected in Western and Southern Transcaucasia. Apparently, *H. perdebile* Woron. and Zahn (*Vestn. Tifl. Bot. Sada*, 22, 1912, 24; *Pflzr.* IV, 280, 1458), described from the former Artvin District, should be included in it. Type unknown.

620. ***H. pseudobrachiatum*** Čel. Prodr. Fl. Böhm. IV (1881) 787; Borb. Balat. fl. 353; N.P. Hier. Mitteleur. I, 624; Zahn in *Pflzr.* IV, 280, 1458; Asch. and Graebn. Synopsis, XII, I, 386.—*H. bifurcum* Dietr. Fl. Boruss. t. 734.—*H. brachiatum* var. *pilosellaeforme* Čel. Prodr. Fl. Böhm. I (1871) 195.—**Exs.**: Hier. Naeg. No. 131; Baenitz. Herb. Europ. No. 7311; F. Schultz. Herb. norm. No. 1155; Callier. Fl. Siles. exs. No. 1244; Fl. Austr.-Hung. norm. exs. No. 3049; Zahn, Hier. Europ. Nos. 538 130, 131, 329, 330, 532; GRF No. 1076 p. p.—*H. bifurciforme* Litw. and Zahn, *Pflzr.* IV, 280, 1460; Zahn, Hier. Europ. No. 430b.

Perennial. Stem (15–)30–35 cm high, 1.5–2.0 mm in diameter, scatteredly to sparsely pilose with dark hairs 2–4 mm long, moderately glandular above, thinning downward, gray above, with thinning but as a whole dense stellate hairs downward, stolons very long, somewhat thickish. Basal leaves 5–7, spatulate, obtuse to oblong and lanceolate and subacute, to 9 cm long, glaucous, (4–9:1), above with sparse bristles 3–6 mm long (f. *longipilum* N.P.) or 1.5–3.0 mm long (f. *brevipilum* N.P.), beneath with dense stellate down; cauline leaves 1(–2) (coefficient of leafiness 0.03), in lower third of stem. Inflorescence shallowly or deeply dichotomous, with 1–5 capitula; acladium one-fifth to as long as stem; peduncles with occasional to sparse hairs, scatteredly glandular, gray-tomentose; floral bracts light-colored or gray. Involucres (6.5)9.0–10.0 mm long, subglobose; involuclral bracts somewhat narrow, acute, blackish, with light border and scattered, 37(32–42), hairs 1.5–2.0 mm long dark, (f. *longipilum* N.P.) or hairs shorter, 1 mm long and few (f. *brevipilum* N.P.), or completely glabrous

(f. *epilosum* N.P.), glands scattered, 24(16–30), 0.5–0.7 mm long, rather dense stellate pubescence, but margin glabrous. Peripheral florets without stripes (f. *estriatum* N.P.) or with red stripes (f. *striatum* N.P.). Flowering June to July.

Dry grassy and stony places, in mountains up to 1,500 m.—*European Part*: Upper Volga, Upper Dniester; *Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor (eastern Anatolia). Described from Bohemia. Type in Prague.

Note. *H. bifurciforme* Litw. and Zahn (*Hier. Europ.* 1910, No. 430b; *Pflzr.* IV, 280, 1460), described from the Caucasus, is also included in this species.

Cycle 3. *Tephrocephala* Juxip.—*H. bauhini* > *hoppeanum* Zahn in *Ann. mus. Hung.* VIII (1910) 53; *Pflzr.* IV, 280, 1437.—*H. tephrocephalum* Vukot. s. 1. *Hier. Croat.* (1858) 8; *Grossh. Fl. Kavk.* IV, 278.—In habit, plants resemble species of subsection *Bauhinia*. Stolons long, mostly thin to thickish; basal leaves spatulate and rounded-obtuse to lanceolate and acute, beneath with conspicuous, scattered to dense, stellate pubescence. Inflorescence very openly paniculate or shallowly dichotomous, with 2–5(–20) capitula; floral bracts light-colored. Involucres 5–7(–8) mm long; involucre bracts mostly somewhat broad, subobtusate, mostly with wide, green border, mostly conspicuously (gray-) stellate-pubescent, however, margins without down. Peripheral florets on outside with dark red stripes; stigmas yellow.

The type species *H. tephrocephalum* Vuk., described from Croatia and itself the hybrid of *H. bauhini* > *macranthum* Zahn (l. c.), does not grow in the Soviet Union. The species found in the Soviet Union in Crimea and especially in Transcaucasia, i.e., in the range of *Hoppeana* 539 (*H. hoppeanum* N.P. coll.), are considered hybrids between species of subsections *Bauhinia* and *Hoppeana*, which, beside morphological characters, is confirmed also by their occurrence in the proximity of their putative parents. They are distinguished with difficulty from the very similar species of *Leptophyta* (*H. leptophyllum* N.P. s. l.), hybrids of *H. bauhini* > *pilosella*, and then mainly by the wider involucre bracts (in herbarium specimens). The affinity of these plants to a species of series *Tephrocephala* may partly explain the occurrences in the montane zone in the proximity of such typically montane elements as the species of *Hoppeana*, whereas the *Leptophyta* are more or less an element of the plains.

621. ***H. christoglossum*** Zahn in *Pflzr.* IV, 280, (1923) 1438.

Perennial. Stem 10–20 cm high, 1 mm in diameter, reddish, scatteredly setose, with occasional glands, densely stellate-pubescent; stolons

long, thin, densely pubescent, tips often ascending, flowering. Basal leaves rather small, lanceolate, moderately setose, scatteredly stellate-pubescent beneath or almost without down; cauline leaves 1–2 (coefficient of leafiness 0.10). Inflorescence openly dichotomously paniculate, with 2–4 capitula, less often several more; acladium 20–40 mm long or shorter; peduncles with scattered hairs and sparse, small glands, dark gray from down. Involucres 5–7 mm long; involucral bracts narrow, acute, with wide, green border, sparsely pubescent, scatteredly or sparsely glandular, scatteredly stellate-pubescent. Peripheral florets on outside with or without red stripes. Flowering June.

Mountains, in yailas.—*European Part*: Crimea. Endemic. Described from Ai-Petri. Type in Leningrad.

Note. Probably, *H. tephropodoides* Zahn (Pflzr. IV, 280, 1438) should be included in this species. It is distinguished by denser pubescence and downiness on the involucral bracts, denser stellate pubescence on the lower surface of the leaves, and by the absence of stripes on the florets. Type unknown.

622. **H. subrubellum** Schelk. and Zahn. in Vestn. Tifl. Bot. Sada, 29 (1913) 5; Pflzr. IV, 280, 1438.

Perennial. Stem 40–50 cm high, 1.5–2.0 mm in diameter, with moderate bristles 2–4 mm long, above with occasional glands, densely stellate-pubescent to base; stolons somewhat long, somewhat thin. Outer basal leaves spatulate, rounded-obtuse, inner lanceolate, acute, on both sides with rather dense hairs 2–4 mm long, moderately stellate-pubescent beneath; cauline leaves 2–4 (coefficient of leafiness 0.07), densely stellate-pubescent beneath. Inflorescence more or less compact, pseudo-umbellate, with up to 20 capitula; acladium 12 mm long; peduncles sparsely pubescent, with occasional glands, gray-tomentose. Involucres 5–6 mm long; involucral bracts somewhat wide, obtuse, with wide green border, scatteredly pubescent, with occasional
540 glands, gray from stellate down. Peripheral florets on outside with dark red stripes. Flowering June.

Middle montane zone.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from Karabakh (Azerbaijan). Type unknown.

623. **H. purpureovittatum** Zahn in Vestn. Tifl. Bot. Sada, 22 (1912) 280; Pflzr. IV, 280, 1438.

Perennial. Stem 25–35 cm high, 1.0–1.5 mm in diameter, with sparse hairs 2–3 mm long, eglandular, stellate-pubescent almost all over stem; stolons very long, thin distinctly setose, small-leaved, leaves grayish beneath from down. Basal leaves lanceolate, above, mainly along margin, with scattered bristles 3–5 mm long, beneath densely stellate-



pubescent; cauline leaves 1–2 (coefficient of leafiness 0.05). Inflorescence openly dichotomously paniculate, with 3–5(–10) capitula; acladium 20–50 mm long; peduncles with occasional hairs and glands, gray-tomentose. Involucres 6–7 mm long, ovate-cylindrical; involucre bracts somewhat wide, acute, dark, inner with wide, green border, sparsely pubescent and glandular, gray from stellate down. Peripheral florets on outside with dark red stripes. Flowering June.

Middle montane zone.—*Caucasus*: Eastern Transcaucasia. *General distribution*: Balkans-Asia Minor. Endemic. Described from former Artvin District. Type unknown.

624. **H. purpureibracteum** Zahn in Fedde, Repert. III (1907) 185; Pflzr. IV, 280 (1923) 1438.

Perennial. Stem 20–35 cm high, 1.0–1.5 mm in diameter, with few (occasional) hairs to 4 mm long, eglandular, scatteredly stellate-hairy; stolons short (to 7 cm), small-leaved. Basal leaves 6(4–8), lanceolate, to 5 cm long (7:1), with occasional bristles 2.5 mm long above, without hairs beneath, as a whole hardly to sparsely pubescent, scatteredly stellate-pubescent beneath; cauline leaves 2–3 (coefficient of leafiness 0.09), narrowly lanceolate (11:1). Inflorescence with 2–5 capitula; acladium to 20 mm long; peduncles with occasional hairs 2 mm long, eglandular, gray from down; floral bracts light-colored, almost always purple-bordered. Involucres 6–8 mm long; involucre bracts narrow, acute, with light-colored border and reddish tip, with sparse, 13(10–16), hairs to 2 mm long and occasional, 4(2–8), glands 0.4–0.5 mm long, very scatteredly stellate-pubescent. Peripheral florets on outside with distinct red stripes; stigmas yellow. Flowering June to July.

Mixed forests and up to alpine zone.—*Caucasus*: Dagestan, Eastern and Western Transcaucasia. *General distribution*: Balkans-Asia Minor. Endemic. Described from Dagestan. Type in Tbilisi.

- 543 *Cycle 4. Ruprechtia* Juxip.—*H. bauhini* < *hoppeanum* Zahn in Fedde, Repert. III (1907) 185; Pflzr. IV, 280, 1438.—*H. ruprechtii* Boiss. Fl. or. III (1875) 861; Suppl. (1888) 326, s. l.; Grossh. Fl. Kavk. IV, 278.—*H. stoloniflorum* Boiss. l. c.—In habit, plants resemble species of cycle *Brachiata*. Stem 10–30 cm high; stolons long, somewhat thin, mostly densely pubescent, small-leaved. Basal leaves beneath moderately stellate-pubescent to gray-tomentose; cauline leaves 0(–1). Inflorescence mostly deeply dichotomous, with (1–)2–3 capitula; involucres 6–8(–10) mm long, ovate; peripheral florets on outside with more or less dark, red stripes; stigmas yellow.

Montane forms, found in Soviet Union in Crimea and Transcaucasia.

625. **H. tuscheticum** Zahn in Fedde, Repert. III (1907) 186; Pflzr. IV, 280, 1440.

Perennial. Stem 25–50 cm high, thin, with very sparse (occasional) hairs; stolons small-leaved, scatteredly pubescent, moderately stellate-pubescent. Basal leaves lanceolate, acute, above with sparse bristles 3 mm long, beneath scatteredly stellate-pubescent; cauline leaves absent. Inflorescence deeply dichotomous (to half height of stem), with 2–3 capitula. Involucres 6.0–6.5 mm long, ovate; involucral bracts somewhat narrow, subacute, dark, weakly bordered, glabrous, sparsely glandular, more or less stellate-pubescent. Peripheral florets on outside with intense red stripes. Flowering June to July.

Middle montane zone.—*European Part*: Crimea; *Caucasus*: Dagestan? (Tushetia). Endemic. Described from Tsokalto (Ruprecht). Type unknown.

626. **H. jailanum** Zahn in Pflzr. IV, 280 (1923) 1439.

Perennial. Stem 10–20 cm high, very thin; stolons short, thin, with somewhat long, lanceolate leaves. Basal leaves mostly small, oblong and obtuse to lanceolate and acute, with moderate bristles 3–4 mm long, beneath sparsely or scatteredly stellate-pubescent; cauline leaves absent. Inflorescence shallowly or deeply dichotomous, with 2–3 capitula. Involucres 6–7 mm long; involucral bracts somewhat wide, subobtusely, darkish, with wide green border and often very dark purple tips, moderately pubescent and equally glandular, at base with stellate down. Peripheral florets on outside with reddish stripes. Flowering June to July.

Mountains.—*European Part*: Crimea. Endemic. Described from Ai-Petri (Crimea). Type unknown.

627. **H. tephropodum** Zahn in Pflzr. IV, 280 (1923) 1439.

544 Perennial. Stem 10–15 cm high, moderately setose, bristles 2–3 mm long, glandular, glands thinning downward almost to base; stolons up to long, with long, dense white hairs. Basal leaves small, oblong or obovate, some obtuse, setose, beneath somewhat gray-green from stellate down; cauline leaves absent. Inflorescence shallowly or very deeply dichotomous, with 1–2 capitula. Involucres 7–8 mm long; involucral bracts somewhat wide, subacute or acute, rather densely covered with hairs 2–3 mm long, sparsely glandular and scatteredly stellate-pubescent. Peripheral florets on outside with deep red stripes. Flowering June to July.

Mountains.—*European Part*: Crimea. Endemic. Described from Ai-Petri. Type unknown.

628. **H. ruprechtii** Boiss. Fl. or. III (1875) 861; Suppl. 326 p. p.; Zahn in Fedde, Repert. III, 186; Pflzr. IV, 280, 1439.

Perennial. Stem 20–25 cm high, 2 mm in diameter, with scattered bristles 2–4 mm long and sparse, long glands down to base, more or less densely stellate-pubescent; stolons long, thin, with dense hairs 3–5 mm long and somewhat large leaves. Basal leaves lanceolate, on both sides with scattered bristles 3–5 mm long, beneath moderately stellate-pubescent; cauline leaves absent. Inflorescence deeply dichotomous; acladium to half as long as stem, with 3 capitula; peduncles with sparse hairs 2–3 mm long, eglandular. Involucres 9–10 mm long, thick, ovate; involucre bracts somewhat narrow, acute, the tip often reddish, with rather dense hairs 2–3 mm long, sparsely glandular, at base densely stellate-pubescent. Peripheral florets on outside with dark red stripes.

Lower alpine zone.—*Caucasus*: Dagestan. Endemic. Described from Gunib. Type unknown.

Section 18. Cymosina N.P. Hier. Mitteleur. I (1885) 116, 398, 807; Zahn in Pflzr. IV, 280, 1305; Asch. and Graebn. Synopsis, XII, I, 6, 204.—Characters in key to sections (p. 9).

Whole plant (stem, leaves) with frequent, long and stiff, upright or short and soft hairs; stem tall (to 100 cm high), solid; rhizome mostly without stolons (rarely with underground, weak stolons, but in plants grown from other sections stolons may be present); leaves on both sides with more or less distinct stellate down, mostly yellowish-green; cauline leaves 2–4(–7), their tips mostly with glands; inflorescence pseudo-umbel, later open, mostly many-headed (in forms transitional to section *Pilosellina* may be even dichotomous); capitula small; florets mostly dark yellow.

Plants of dry and arid places, which prefer calcareous soil; distributed in Scandinavia, Central Europe, and mostly in the Mediterranean region. They are absent in Atlantic Europe, Spain, Sardinia and Sicily. According to Zahn, the eastern border of their range passes through Kherson, Kharkov, Voronezh, Samara, and Sverdlovsk to the Ob' Region; the northern boundary coincides with the border of the Arctic region. In his monograph, Zahn shows the distribution of *Cymosina* also in the western part of Asia Minor (subsection *Sabina*) but later
545 (Asch. and Graebn. l. c.) doubts it. On the basis of this report, A.A. Grossheim, in the *Flora of the Caucasus*, notes concerning *H. cymosum* L. coll. “.. reported from the Caucasus.” There are no species of this section in the Herbarium of the Botanical Institute of the Academy of Sciences of the USSR from the Caucasus.

Based on the description in the Flora of the Caucasus and annotations on herbarium labels, K. Meinshausen (*Flora Ingrica*, 1878, 198), mistook some form of *Cymosina* for *H. nigricans* Meinsh. But since in the Herbarium of the Botanical Institute very different plants were identified by him under this name, it would be best to reject this name. Most of the specimens named by him as *H. nigricans* belong to *H. ambiguum* Ehrh.

1. Inflorescence umbellate or umbellate-paniculate; mostly with many capitula.....2.
- + Inflorescence dichotomous (shallowly or deeply), usually with few capitula; involucre bracts and peduncles densely glandular; plants with stolons similar to those of *H. pilosella*.....Subsection 5. **Laschia** Juxip
2. Plants with more or less dense stellate pubescence and pubescence of simple hairs.....3.
- + Plants with more or less sparse stellate pubescence and pubescence of simple hairs but densely glandular; in habit, resembling large specimens of *H. auricula*.....Subsection 4. **Sciadopora** Juxip
3. Hairs in lower part of stem upright.....4.
- + Hairs in lower part of stem horizontally spreading; hairs and glands in inflorescence more or less equal in number or glands predominant; glands on involucre bracts more or less evenly distributed throughout.....Subsection 3. **Cymosoprattensina** Juxip
4. Hairs on whole plant more or less 1–6 mm long; involucre bracts and peduncles more or less densely pubescent, but mostly sparsely glandular (sometimes almost eglandular); ratio of hairs to glands in inflorescence on average 2:1.....Subsection 1. **Cymosa** Juxip
- + Hairs on whole plant short, rarely longer than 1 mm; involucre bracts and peduncles mostly inconspicuously pubescent, sometimes glabrous but more or less significantly glandular; ratio of hairs to glands in inflorescence on average 1:4; stellate pubescence on plant very dense.....Subsection 2. **Cymigera** Juxip

Subsection 1. Cymosa Juxip.—Subgrex *H. cymosum* N.P. Hier. Mitteleur. I (1885) 400 p. p.; Zahn in Pflzr. IV, 280, 1308; Asch. and Graebn. Synopsis, XII, I, 208.—*H. cymosum* L. Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I (1890) 57; Lindm. Svensk. Fan.-Fl. 2 ed. 597.—*Cymosina* Omang, Hier. Norw. I (1935) 141.—Characters in key to subsections.

546 The species are concentrated mainly in Central Europe, becoming less common eastward; in the Soviet Union, they are found mostly in the western regions.

1. Hairs on involucre bracts considerably more than glands, or hairs and glands more or less equal.....2.
- + Hairs on involucre bracts considerably less than glands, their ratio roughly 1:3; involucre 7.0–8.5 mm long.....638. *H. litoreum* Norrl.
2. Hairs on involucre bracts considerably more than glands.....3.
- + Hairs and glands on involucre bracts more or less equal.....5.
3. Ratio of hairs to glands on involucre bracts roughly 9:1; involucre bracts with dense hairs but occasional, small, inconspicuous glands; involucre 6–7 mm long.....629. *H. mollisetum* (N.P.) Dahlst.
- + Ratio of hairs to glands on involucre bracts roughly 8–7:1; involucre 7–8 mm long.....4.
4. Involucre bracts somewhat wide, black, without border; leaves blue-green, sparsely pubescent.....630. *H. syrjaenorum* Norrl.
- + Involucre bracts narrow, green, with purple tips; leaves light green, to moderately pubescent.....631. *H. signiferum* Norrl.
- 5(2). Hairs on involucre bracts moderate to scattered.....6.
- + Hairs on involucre bracts scattered to sparse.....7.
6. Hairs on involucre bracts 2–3 mm long, light-colored; involucre bracts acute; leaves light-green, moderately pubescent.....632. *H. trichocomosum* Zahn
- + Hairs on involucre bracts to 1 mm long, gray; involucre bracts subobtusate; leaves dark green, densely pubescent.....633. *H. scotodes* Norrl.
7. Hairs on involucre bracts to scattered.....8.
- + Hairs on involucre bracts sparse; involucre 5.5–7.0 mm long; involucre bracts light green, moderately pubescent.....637. *H. leptadenium* Dahlst.
8. Leaves and stem at base densely hairy and densely stellate-pubescent; peduncles distinctly glandular....634. *H. cymosum* L.
- + Leaves and stem at base scatteredly or to moderately hairy and similarly stellate-pubescent; peduncles sparsely glandular.....9.
9. Stem with hairs 2 mm long, leaves with hairs 1.0–1.5 mm long.....635. *H. eusciadium* (N.P.) Dahlst.
- + Stem with hairs 2.5–5.0 mm long, leaves with hairs 1.5–3.0 mm long.....636. *H. tabergense* Dahlst.

- 547 *Cycle 1. Setigeriformia* Juxip.—Subgrex *H. setigeriforme* Zahn in Pflzr. IV, 280 (1923) 1314 p. p.—Involucral bracts with occasional or sparse glands; stem and leaves densely setose with bristles; 2–6 mm long; stolons always absent.

629. *H. mollisetum* (N.P.) Dahlst. Bidr. Sydöstr. Sverig Hier.-Fl. I (1890) 68; Lindm. Svensk. Fan.-Fl. 2 ed. 597; Zahn in Pflzr. IV, 280, 1314.—*H. fallax* ssp. *mollisetum* 1 *trichanthum* N.P. Hier. Mitteleur. I (1885) 517.—*H. setigerum* Lindeb. Hier. Scand. (1868) No. 25.—*H. rothianum* Lindeb. in Hartm. Handb. ed. Scand. Fl. 11 (1877) 38.—Exs.: Fr. Hier. Europ. No. 37 (sub *Pilosella setigera*); Lindeb. Hier. Scand. No. 105; Dahlst. Hier. Scand. VIII, Nos. 96, 97.

Perennial. Stem 40–70 cm high, 3.5 mm in diameter, flexuous, with dense, soft, white bristles at base, 3–6 mm long, thinning upward to moderate, with occasional glands above, densely stellate-pubescent. Outer basal leaves obovate, spatulate to broadly lanceolate, obtuse, inner lanceolate, acute, yellow-green, densely pubescent with soft, flexuous bristles 2–4 mm long, scatteredly stellate-pubescent above to densely so beneath; cauline leaves 3–8 (coefficient of leafiness 0.10). Inflorescence very loosely umbellate, with 15–45 capitula; acladium 10–14 mm long; peduncles densely pubescent, with occasional glands, gray-tomentose; floral bracts gray. Involucres 6–7 mm long, cylindrical; involucral bracts with dense, light-colored hairs 1–4 mm long, with fine wax-like, indistinct, occasional glands, gray from down. Corollas light yellow. Flowering June to July.

European Part: Dvina-Pechora, Ladoga-Ilmen. *General distribution:* Scandinavia. Described from Sweden (Uppsala). Type in Munich.

Note. Apparently, *H. granitophilum* Norrl. (*Nya nord. Hier.* I, 1904, 95; Mela-Cajander, *Suom. Kasvio*, 661; *Pflzr.* IV, 280, 1323) should be included here; it is found in the Karelian isthmus (Ladoga-Ilmen). Type in Helsinki.

630. *H. syrjaenorum* Norrl. Pilos. bor. (1895) 74; Zahn in Pflzr. IV, 280, 1316.—Exs.: Norrl. Hier. exs. II, No. 99.

Perennial. Stem 30–60 cm high, 2 mm in diameter, at base with moderate or scattered light-colored hairs 2–3 mm long, becoming fewer and darkish above, above with sparse to occasional glands, with scattered stellate pubescence; without stolons. Basal leaves 1–2, oblong-spatulate to lanceolate and acute, to 12 cm long (11:1), outer often withering, blue-green, glaucescent, more or less light-colored, as a whole on both sides sparsely hairy, above with coarse bristles 2–5 mm long, beneath with sparse, softer hairs 2.5 mm long, denser along midrib, to 5 mm long, above very sparsely stellate-pubescent, beneath

- 548 scatteredly so; cauline leaves 2–3 (coefficient of leafiness 0.05), narrow (13:1), often eglandular. Inflorescence umbellate, with 10–15 capitula; acladium 8–20 mm long; peduncles moderately setose with light-colored bristles 2–3 mm long, scatteredly glandular; gray-tomentose; floral bracts dark. Involucres (6.5–)7–8 mm long, ovate; involucre bracts somewhat wide, subobtusate (less frequently narrower and subacute), black, without border, with scattered, 32(28–36) (or sometimes sparse), light-colored hairs, 2.0–2.5 mm long, and occasional, 6(4–8), glands 0.3 mm long, crowded toward tips, scatteredly stellate-pubescent, along margin glabrous. Corollas golden yellow, teeth of peripheral florets on outside slightly reddish or concolored. Flowering June to July.

Stony riverbanks.—*European Part*: Karelia-Lapland, Dvina-Pechora, Endemic. Described from banks of Umba River (a tributary of Pizhma River). Type in Helsinki.

631. **H. signiferum** Norrl. Pilos. bor. (1895) 70; Zahn in Pflzr. IV, 280, 1312.—**Exs.**: Norrl. Hier. exs. II, No. 95.

Perennial. Stem 40–50 cm high, 1.5–2.0 mm in diameter, flexuous, at base reddish-violet and moderately covered with thin, white hairs 1.5–2.5 mm long, thinning upward, with occasional glands, moderately stellate-pubescent. Basal leaves 1–2, spatulate-oblong to lanceolate (sometimes rounded-ovate initial leaves persisting at anthesis), more or less entire, distinctly light green, as a whole moderate, thin bristles 1.0–1.5 mm long, on both sides stellate-pubescent; cauline leaves 1–3 (coefficient of leafiness 0.04), lanceolate with broad base, densely stellate-pubescent, tip of upper leaf with occasional glands. Inflorescence umbellate-paniculate, with 10–12 capitula; acladium 10–15 mm long; peduncles with scattered, thin, gray hairs 2–3 mm long and occasional fine glands, gray-tomentose; floral bracts somewhat dark. Involucres 7–8 mm long; involucre bracts narrow, subobtusate, with reddish-purple tips, at base hairs to dense, toward tip to occasional, thinning, gray, 2–3 mm long, glands, on the contrary, occasional at base, increasing toward tip to scattered, fine, moderately stellate-pubescent. Corollas and stigmas yellow. Flowering June to July.

Gravelly calcareous coastal cliffs.—*European Part*: Dvina-Pechora, Endemic. Described from banks of Pizhma River. Type in Helsinki.

Note. It is readily recognized by the light-colored leaves and red tips of the involucre bracts.

Cycle 2. Cymosa Juxip.—Subgrex *H. cymosum* Zahn in Pflzr. IV, 280, 1308.—*H. eu-cymosum* Zahn in Asch. and Graebn. Synopsis, XII, I (1929) 208.—Glands and hairs on involucre bracts more or less equal

in number; leaves and inflorescence very densely pubescent; plant often with stolons.

632. **H. trichocymosum** Zahn in Sched. HFR VI (1908) 81, No. 1815; Pflzr. IV, 280, 1311.—**Exs.:** GRF No. 1815.

549 Perennial. Stem 70–80 cm high, at base very densely covered with light-colored hairs 2–3 mm long, thinning upward and above with scattered, dark bristles 2–4 mm long and scatteredly glandular, scatteredly stellate-pubescent, without stolons. Basal leaves 2–3, outer spatulate, obtuse, inner lanceolate to narrowly lanceolate, acute, to 22 cm long (5–8:1), light green, more or less moderately and short-pubescent, scatteredly above, to densely stellate-pubescent beneath; cauline leaves 3 (coefficient of leafiness 0.05), lanceolate, acute. Inflorescence umbellate, with 15–25 capitula; acladium 5–10 mm long; peduncles sparsely dark-hairy, sparsely glandular, gray-tomentose. Involucres 7 mm long; involucre bracts narrow, acute, with scattered, 37(30–40), light-colored hairs 2–3 mm long and scattered, 36(30–45), long glands 0.3–0.4 mm, with scattered stellate down. Stigmas yellow-brown. Flowering June to July.

Edges of birch forests.—*European Part:* Upper Volga. Endemic. Described from Staritsky District of Kalinin Region. Type in Leningrad.

Note. Apparently, *H. regelii* N.P. (*Hier. Mitteleur.* I, 1885, 410; Zahn in Pflzr. IV, 280, 1314; Asch. and Graebn. *Synopsis*, XII, I, 213), described from St. Petersburg (cultivated plant?), should be included in this species; it is distinguished by its small stature (20–25 cm high) and few (5–6) capitula in the inflorescence. Type in Munich.

633. **H. scotodes** Norrl. Nya nord. Hier. I (1904) 117; Zahn in Pflzr. IV, 280, 1313.—**Exs.:** Norrl. Hier. exs. IV, No. 91.

Perennial. Stem 35–60 cm high, 2–3 mm in diameter, reddish at base and to densely covered with thin bristles 2–3 mm long, thinning upward to occasional, above with occasional glands, stellate-pubescent, below inflorescence, hyaline-tomentose, without stolons. Basal leaves 3–5 rather large, ovate to oblong-ovate or broadly- to narrowly-lanceolate, subobtuse to short-acuminate, with thin, fine teeth, dark green, as a whole to rather densely covered with bristles to 2 mm long, above sparsely stellate-pubescent, beneath moderately so; cauline leaves 2–3 (coefficient of leafiness 0.05), lingulate to linear-lanceolate, small, upper leaves glandular. Inflorescence umbellate-paniculate, with very remote lower branch, with up to 11 capitula; peduncles with occasional bristles 1.5 mm long and scattered, fine glands, gray-tomentose; floral bracts whitish. Involucres 6.5–7.0 mm long; involucre bracts narrow, subobtuse, with border, blackish-green, with hairs scattered to

moderate, gray, to 1 mm long and scattered, fine, black glands, scatteredly stellate-pubescent. Corollas yellow with short ligules; stigmas yellow. Flowering June to July.

Meadows.—*European Part*: Dvina-Pechora (southern part). Endemic. Described from banks of Sukhona River. Type in Helsinki.

634. *H. cymosum* L. Sp. pl. II (1763) 1126; Froel. in DC. Prodr. VII, 207; Ldb. Fl. Ross. II, 849, p. p.; N.P. Hier. Mitteleur. I, 401; Zahn in Pflzr. IV, 280, 1309; Asch. and Graebn. Synopsis, XII, I, 209.—*H. nestleri* Koch Synopsis, 2, II (1844) 515; F. Schultz, Arch. fl. Fr. et d'-Allem. II (1855) 154, nec Vill.—*H. poliotrichum* Wimm, Fl. Schles. I (1841) 443.—*H. cymosum* Dietr. Fl. Boruss. t. 737.— *Ic.*: Rchb. Ic. XIX (1854) 60, t. 125, II; Hegi, Ill. Fl. VI, 2, fig. 876.— *Exs.*: Hier. Naeg. Nos. 92, 253, 254; Fr. Hier. Europ. No. 35; Zahn, Hier. Europ. Nos. 319, 615, 725; Fl. exs. Austr.-Hung. No. 3025, I-II; Baenitz, Herb. Europ. Nos. 2167, 4079, 7372, 7373, 8991.

Perennial. Stem 50(20–100) cm high, 1–4 mm in diameter, often flexuous, at base densely pilose with long (2–4 mm), upright hairs, thinning upward, above scatteredly glandular, with glands almost to middle of stem, densely stellate-pubescent throughout; stolons absent or short, mostly underground, weak and filiform or with collateral, runner-like stems. Basal leaves 6(2–12), oblong and obtuse to lanceolate and acute, to 25 cm long (9–10:1), green or yellowish-green, on both sides pubescent: above with scattered bristles 1.5–3.0 mm long, beneath with dense bristles 1.0–1.5 mm long, beneath along midrib with very dense hairs 1.5–3.0 mm long, along margin with scattered hairs 1.0–1.5 mm long, as a whole to densely hairy, with stellate down above scattered, to dense beneath; cauline leaves 1–3(–7) (coefficient of leafiness 0.06), narrowly lanceolate to linear, pubescence as on basal leaves, densely stellate-hairy and with glands at tips and beneath (particularly in upper leaves). Inflorescence umbellate, with (5–)20–50(–100) capitula; acladium 4–10 mm long; peduncles with sparse to scattered hairs 1–2 mm long, sparsely to densely glandular, gray-tomentose; floral bracts gray. Involucres 6–8 mm long, cylindrical; involucral bracts narrow, subacute, dark, with very narrow, light green border, with sparse to scattered, 20(10–30), hairs 1.5–3.0 mm long and scattered, 35(10–40), glands 0.2(–0.5) mm long, crowded mainly toward tip, scatteredly stellate-pubescent. Corollas golden yellow; stigmas yellow. Flowering June to July.

Dry open glades, on south slopes, calcareous rocks, edges of alvar pine forests, edges of oak-hornbeam forests.—*European Part*: In all regions excluding North and Crimea, Lower Don, Lower Volga

and Trans-Volga; *Western Siberia*: Ob Region, Irtysh. *General distribution*: Scandinavia, Central Europe (eastern part), Mediterranean, Balkans-Asia Minor. Described from Sweden. Type in London.

Note 1. A highly polymorphic species, distinguished by the character and density of the pubescence and glandularity. It is associated with the presence of lime in the soil and, therefore, may be absent over large areas, which explains its distribution. Earlier, it was often identified with *Cymigera*; as a result, its range is difficult to determine on the basis of the literature; however, apparently, it is found much less frequently than species of *Cymigera*.

Note 2. Apparently, *H. holmiense* (N.P.) Dahlst. (*Bidr. Sydöstr. Sverig. Hier.-Fl.* I, 1890, 58; Zahn in *Pflzr.* IV, 280, 1311.—*H. cymosum* ssp. *cymosum* L. γ. *holmiense* N.P. Hier. *Mitteleur.* I, 1885, 402) should be included in this species. It differs from typical *H. cymosum* L. only by shorter (1–1.5 mm) hairs on all parts. It is a very rare species in the Soviet Union: only one report from the Estonian SSR (identified by Dahlstedt). Type in Stockholm.

635. ***H. eusciadium*** (N.P.) Dahlst. *Bidr. Sydöstr. Sverig. Hier.-Fl.* I (1890) 79; Lindm. *Svensk. Fan.-Fl.* 2, ed. 598; Zahn in *Pflzr.* IV, 280, 1317; Asch. and Graebn. *Synopsis*, XII, I, 214.—*H. cymosum* ssp. *eusciadium* N.P. Hier. *Mitteleur.* I (1885) 411.

Perennial. Stem 40–95 cm high, 1.5–5.5 mm in diameter, at base with sparse, upwardly thinning, black hairs (0.5–)2 mm long, with occasional glands and rather dense stellate pubescence; stolons absent or short, thin, underground. Basal leaves few at anthesis, spatulate to narrowly lanceolate, subacute, to 25 cm long (11–17:1), yellow-green or somewhat glaucescent, on both sides with moderate hairs 1.0–1.5 mm long, above stellate pubescence occasional to sparse, beneath scattered to rather dense; cauline leaves 2–3(–7) (coefficient of leafiness 0.05), linear-lanceolate, eglandular or with sparse glands. Inflorescence openly umbellate, its branches considerably much longer than acladium, with 10–50(–108) capitula; acladium 10–15 mm long; peduncles with sparse, dark, short and long (1–3 mm) intermixed hairs and isolated glands, white-tomentose; floral bracts blackish. Involucres (6.5–)7–8 mm long, ovate; involucral bracts somewhat wide, acute, black, with wide border, with scattered, 26(10–35), dark hairs 1–2 mm long, and sparse, 30(20–40), glands 0.2–0.4 mm long, crowded toward tip, gray from down. Stigmas yellowish-brown. Flowering June to July.

Edges of pine forests on dry sandy soil.—*European Part*: Baltic Region. *General distribution*: Scandinavia. Described from Norway. Type in Stockholm.

636. **H. tabergense** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I (1890) 63; Beitr. Hier.-Fl. Oesels, 19; Zahn in Pflzr. IV, 280, 1313; Asch. and Graebn. Synopsis, XII, I, 214.

Perennial. Stem 25–80 cm high, 2.0–3.5 mm in diameter, at base moderately setose with long (2.5–5.0 mm), upright bristles, with occasional, long, dark bristles above with occasional glands, sparsely stellate-pubescent. Basal leaves 5(1–12), lanceolate to linear-lanceolate, acute, to 22 cm long (11:1), above with sparse bristles 2–5 mm long, beneath scattered, along midrib dense, as a whole scatteredly pubescent, green, above sparsely stellate-pubescent, beneath moderately so; cauline leaves 2–4(–5) (coefficient of leafiness 0.06), more or less linear-lanceolate, acute, with denser stellate pubescence, above scattered, beneath to dense. Inflorescence openly umbellate, with 5–40(–75) capitula; acladium 15–20 mm long; peduncles with up to sparse hairs and occasional glands, gray-tomentose. Involucres (6–)7.0–7.5(–8) mm long, cylindrical; involucral bracts somewhat wide, subobtus, with sparse to scattered, 20(10–30), hairs 1.5–2.5 mm long and equally scattered, 17(6–30), glands 0.2–0.5 mm long, scatteredly stellate-pubescent. Corollas light yellow; stigmas yellow. Flowering June to July.

Dry stony places.—*European Part*: Baltic Region (Estonian SSR). *General distribution*: Scandinavia. Described from Sweden. Type in Stockholm.

637. **H. leptadenium** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I (1890) 65; Beitr. Hier.-Fl. Oesels, 19; Lindm. Svensk. Fan.-Fl. 2, ed. 597; Zahn in Pflzr. IV, 280, 1316; Asch. and Graebn. Synopsis, XII, I, 210.—*Exs.*: Dahlst. Hier. exs. II, No. 18; Hier. Scand. X, No. 14.

Perennial. Stem 20–140 cm high, 1.5–3.5 mm in diameter, at base with moderate upright hairs 1.5–4.0 mm long, thinning upward to sparse, above with sparse glands, densely stellate-pubescent. Basal leaves 5(3–9), outer spatulate to lingulate, obtuse, inner lanceolate to narrowly lanceolate, acute to acuminate, to 18 cm long (10:1), light green, above with scattered hairs 2.0 mm long, hairs beneath moderate, 1 mm long, along midrib dense, 2 mm long, and along margin scattered, 1.0–1.5 mm long, as a whole moderately pubescent, above sparsely stellate-hairy, beneath moderately so; cauline leaves 3(1–4(–7)) (coefficient of leafiness 0.05), linear, more sparsely hairy but more densely stellate-pubescent. Inflorescence openly umbellate-paniculate, with 8–40(–77) capitula; acladium 13–15 mm long; peduncles with sparse, flexuous, light-colored hairs 2 mm long with black base and sparse, fine glands 0.2–0.3 mm long, scarcely visible in thick gray down. Involucres 5.5–7.0 mm long, ovate involucral bracts somewhat broad, subacute, with wide, pale green border, with scattered, 20(15–25), thin, white, flexuous hairs 2 mm

long and sparse to scattered, 20(10–30), glands 0.3 mm long, with dense stellate down. Florets light yellow. Flowering June to July.

Open forests, moraines, meadows overgrown with occasional shrubs.—*European Part*: Baltic Region (Estonian SSR). *General distribution*: Scandinavia. Described from Sweden. Type in Stockholm.

Note. Two species described from the Karelian Isthmus (Ladoga-Ilmen), viz., *H. semilitoreum* Norrl. (Mela-Cajander, *Suom. Kasvio*, 1906, 672; *Pflzr.* IV, 280, 1316) and *H. tenacicaule* Norrl. (*Nya nord. Hier.* II, 1912, 53; *Pflzr.* 1. c.), apparently, should be included in *H. leptadenium* Dahlst. Their types are in Helsinki.

Cycle 3. Litorea Juxip.—Hairs on involucre bracts many fewer than glands.

- 553 638. **H. litoreum** Norrl. Pilos. bor. (1895) 76; Mela-Cajander, *Suom. Kasvio*, 675; Zahn in *Pflzr.* IV, 280, 1316.—*H. pycnochaetum* Brenn. Finl. Hier.-form. III (1894) 10.—**Exs.**: Norrl. Hier. exs. fasc. V, Nos. 55, 56.

Perennial. Stem 30–60 cm high, 2–3 mm in diameter, with scattered, upright bristles 4–5 mm long below, thinning upward, sparse glands 0.5–0.6 mm long above, rather densely stellate-pubescent, mostly without stolons. Basal leaves 2–5, outer obovate, obtuse, often drying before anthesis, inner spatulate, lingulate to lanceolate, acuminate, to 18 cm long (10–13:1), blue-green, as a whole pubescence sparse to scattered, above with bristles 2.5–6.0 mm long, along margin and beneath with hairs 1.0–1.5 mm long, sparsely stellate-pubescent above, moderately so beneath; cauline leaves 2–3(5) (coefficient of leafiness 0.06), narrowly lanceolate, acute (11–15:1), scatteredly stellate-hairy above, densely beneath, almost eglandular. Inflorescence umbellate, with 3–12(–40) capitula; acladium 5–20 mm long; peduncles with occasional, dark hairs 1.5–2.5 mm long and moderate glands 0.3–0.8 mm long, gray-tomentose. Involucres 7.0–8.5 mm long, ovate; involucre bracts somewhat narrow, subacute, blackish, with sparse, 20(10–30), hairs 2.5 mm long black and moderate, 57(35–85), (to dense) glands 0.3–0.5 mm long, scatteredly stellate-pubescent. Corollas sulfur-yellow. Flowering June to July.

Rocks and stony cliffs.—*European Part*: Karelia-Lapland, Ladoga-Ilmen (northern part). *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Subsection 2. Cymigera Juxip.—*Grex H. vaillantii* Zahn in *Pflzr.* IV, 280 (1923) 1316; Asch. and Graebn. Synopsis, XII, I, 214.—*H. vaillantii* Tausch in *Flora*, XI (1828) Erg.-Bl. I, 57; nec N.P.—

H. cymigerum Rchb. in Mössl. Handb. Gew. 2, II (1828) 1384; N.P. Hier. Mitteleur. I, 414, pro grege.—*H. cymosum* Ldb. Fl. Ross. II (1844–1846) 849 p. p.—*H. cymosum* *e. nestleri* Froel. in DC. Prodr. VII (1838) 207.—*H. pubescens* Lindb. in Bot. Notis. II (1841) 26; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I, 73; Lindm. Svensk. Fan.-Fl. 2 ed. 597; Omang, Hier. Norw. I, 135.—Characters in key to subsections.

Species of this subsection are distributed mainly in Eastern Europe, and in the Soviet Union they reach Western Siberia.

1. Hairs and glands on involucre bracts more or less equal in number.....639. **H. contractum** Norrl.
- + Hairs on involucre bracts many fewer than glands on or entirely absent.....2.
2. Hairs and glands on involucre bracts in ratio of 1:5.....3.
- 554 + Hairs on involucre bracts completely absent (or occasional).....
.....644. **H. curvescens** Norrl.
3. Glands on involucre bracts scattered.....4.
- + Glands on involucre bracts and peduncles moderate; inflorescence deeply umbellate (its branches long).....
.....643. **H. polymnion** N.P.
4. Leaves and stem scatteredly (to moderately) pubescent; peduncles with occasional hairs.....5.
- + Leaves and stem densely pubescent; peduncles glabrous.....
.....642. **H. suomense** Norrl.
5. Leaves very densely stellate-pubescent, margins finely toothed.....640. **H. denticuliferum** Norrl.
- + Leaves to densely stellate-pubescent, margins entire.....
.....641. **H. cymigerum** Rchb.

Cycle 1. Contracta Juxip.—Hairs and glands on involucre bracts more or less equal in number.

639. **H. contractum** Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 169; Bidr. Skand. Hier.-Fl. I, 72 (sub *Pilosella pubescens* var 1 *contracta* Norrl.); Mela-Cajander, Suom. Kasvio (1906) 669; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I, 75; Lindm. Svensk. Fan.-Fl. 2 ed. 598; Zahn in Pflzr. IV, 280, 1318; Omang, Hier. Norw. I, 137.—*H. cymosum* ssp. *pubescens* Lindbl. 2 *hirsutulum* N.P. Hier. Mitteleur. I (1885) 417.—**lc.**: Omang, op. cit. t. IV, fig. A.—**Exs.**: Norrl. Hier. exs. fasc. IV, Nos. 83, 84.

Perennial. Stem 35–70 cm high, 3–5 mm in diameter, with more or less scattered, upright hairs 1.0–1.5 (sometimes 2.0–2.5) mm long, dense at base and in upper part, above with scattered glands 0.3 mm long, down to middle of stem, with moderate stellate down, dense in upper

part. Basal leaves 4–8, oblong-lanceolate to oblanceolate, acute, to 20 cm long, and narrow (10–16:1), above with scattered bristles 0.4–1.0 mm long, beneath and along midrib moderate, but along margin with sparse bristles 1.0–1.6 mm long (sometimes to 2.0–2.5 mm), as a whole pubescence to scattered, green, stellate pubescence moderate above, dense beneath; cauline leaves 1–2 (coefficient of leafiness 0.03), linear-lanceolate (20–35:1), with occasional glands. Inflorescence compact-umbellate, with (5–)25–30(–80) capitula; acladium 5 mm long; peduncles with occasional bristles 1 mm long, with moderate glands 0.3 mm long, gray-tomentose. Involucres 6.5–7.0(–8.0) mm long; involucral bracts somewhat narrow, acute, with narrow border, with sparse to scattered, 24(20–30), dark bristles 1.5 mm long, and scattered, 38(33–45), glands 0.3 mm long, with dense stellate down. Corollas yellow; stigmas yellow. Flowering June to July.

Dry grassy places, on slopes, moraines and alvars.—*European Part*: Baltic Region, Upper Volga. *General distribution*: Scandinavia. Described from Norway. Type in Helsinki.

555 **Note.** Apparently, *H. leptothyrsoides* Zahn (in *Sched. HFR* VII, 1911, 93, No. 2215; *Pflzr.* IV, 280, 1319), described from the Dvina-Pechora Region (Syktyvkar), should be included in this species; it is distinguished by rudimentary (underground) stolons with occasional scaly leaves.

Some of the specimens, issued as GRF No. 1814 under the name *H. denticuliferum* Norrl. are also included here.

Cycle 2. Cymigera.—*Grex H. vaillantii* Zahn in *Pflzr.* IV, 280 (1923) 1316; *Asch. and Graebn. Synopsis*, XII, I (1929) 214 p. p.—*Subgrex H. euscadium* N.P. Hier. *Mitteleur.* I (1885) 400, 411; Zahn in *Pflzr.* p. p.—*Subgrex H. pubescens* Zahn in *Pflzr.* 1318, p. p.—Hairs on involucral bracts many fewer than glands.

640. **H. denticuliferum** Norrl. *Anteckn. öfv. Finl. Pilos.* I (1884) 167; *Mela-Cajander, Suom. Kasvio*, 669; N.P. Hier. *Mitteleur.* I, 418; Zahn, *Hier. fl. Mosquens.* 26; *Pflzr.* IV, 280, 1318.—**Exs.**: Norrl. *Pilos. Fenn. Nos.* 94–95; Hier. *exs. fasc. IV*, Nos. 73–75; Zahn, *Hier. Europ.* No. 114; GRF No. 1814, 2214 p. p.

Perennial. Stem 30–75 cm high, 2–3 mm in diameter, at base with scattered hairs 1 mm long, thinning upward, above with scattered glands, densely stellate-pubescent. Basal leaves 2–3(–6) at anthesis, lingulate-lanceolate, subobtuse or mostly acute, to 16 cm long, finely toothed, yellowish-green, on both sides with scattered hairs 1 mm long, stellate pubescence above and below moderate; cauline leaves 2–3(–7) (coefficient of leafiness 0.06), linear-lanceolate (15:1), glandular

at tips and beneath along midrib. Inflorescence compactly umbellate-paniculate, with 10–35(–90) capitula; acladium 3–12 mm long; peduncles with occasional hairs 1.0–1.5 mm long and scattered glands, gray from down; floral bracts dark or gray. Involucres (5.5–)6.0–7.5 mm long, cylindrical; involucre bracts somewhat broad, subacute, blackish, scarcely bordered, with occasional, 8(3–12), dark hairs 1 mm long and scattered, 28(18–38), glands 0.3–0.4 mm long, scatteredly stellate-pubescent. Corollas dark yellow. Flowering June to July.

Dry valley meadows.—*European Part*: Karelia-Lapland, Dvina-Pechora, Baltic Region, Ladoga-Ilmen, Upper Volga. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. The following should be treated as synonyms: *H. firmicaule* Norrl. (*Anteckn. öfv. Finl. Pilos.* I, 1884, 168; Mela-Cajander, *Suom. Kasvio*, 669; N.P. *Hier. Mitteleur.* I, 419; Zahn in *Pflzr.* IV, 280, 1318.—**Exs.**: Norrl. *Hier. exs. fasc.* IV, Nos. 76, 77; GRF No. 1264), and *H. euryantheum* Dahlst. (*Bidr. Sydöstr. Sverig. Hier.-Fl.* I, 1890, 81; *Beitr. Hier.-Fl. Oesels*, 21; Lindm. *Svensk. Fan.-Fl.* 2 ed. 598; *Pflzr.* IV, 280, 1317; Asch. and Graebn. *Synopsis*, XII, I, 217; Omang, *Hier. Norw.* I, 139.—**Exs.**: Dahlst. *Hier. exs.* I, No. 34, II, No. 19; *Hier. Scand.* VIII, Nos. 89–100). Types in Helsinki.

556 The plants issued in the GRF under No. 1814 belong at least in part to *H. contractum* Norrl.

641. **H. cymigerum** Rchb. *Fl. Germ. exc.* (1830) 262; N.P. *Hier. Mitteleur.* I, 414; Zahn, *Hier. fl. Mosquens.* 26; *Pflzr.* IV, 280, 1320; Asch. and Graebn. *Synopsis*, XII, I, 215.—*H. pseudocymigerum* N.P. op. cit. p. 420.—*H. pubescens* Lindbl. in *Bot. Notis.* II (1841) 26, p. p.; Fr. *Epicr.* 35 p. p.; Mela-Cajander, *Suom. Kasvio*, 670; *Beitr. Hier.-Fl. Oesels.* 20, coll.; Zahn in *Pflzr.* op. cit. p. 1319; Omang, *Hier. Norw.* I, 136.—*H. cymosum pauciflorum* Meinsh. *Fl. Ingr.* (1878) 375.—*H. cymosum* ssp. *pubescens* N.P. *Hier. Mitteleur.* op. cit. p. 416.—*H. nigrans* Almqu. ex Dahlst. *Bidr.* (1890) 76; *Beitr. Hier.-Fl. Oesels.* 20; Norrl. *Pilos. bor.* 67; Mela-Cajander, op. cit. p. 670; Zahn in *Pflzr.* op. cit. p. 1319; Asch. and Graebn. op. cit. p. 217.—*H. cymosum* L. (coll.) Nevski in *Fl. Yugo-Vost.* IV, (1936) 477.—**lc.**: Rchb. *lc.* XIX (1859) 64, t. 124; Syreistsch. *Fl. Mosk. Gub.* III, 353.—**Exs.**: *Hier. Naeg.* No. 93; *Fl. Austr. Hung. exs.* 3026 I, II; Baenitz. *Herb. Europ.* Nos. 1304, 6096, 7371, 8990; Zahn, *Hier. Europ.* Nos. 420, 521, 619, 726, 831; GRF Nos. 1261a, b, 1262, 1263, 1265, 2214a–e, sub *H. cymigero*; Fr. *Herb. norm.* XIII, No. 12; *Hier. Europ.* No. 35; Dahlst. *Hier. exs.* I, No. 35; II, No. 15; *Hier. Scand.* VII, No. 99, X, No. 15; Lindeb. *Hier. Scand.* No. 22; Norrl. *Hier. Exs. fasc.* I, No. 79, fig. IV, No. 85, sub *H. pubescens* var. *allochroum* Norrl. *fasc.* IV, No. 87, sub *H. pubescens* ssp. *suchonense*



Plate XXXI.

1—*H. gentile* Jord.; 2—*H. onegense* Norrl.

Norrl. fasc. IV, No. 89, fasc. V, No. 52, sub *H. pubescens* var. *auriginans* Norrl. fasc. V, No. 53, sub *H. pubescens* ssp. *glomerabile* Norrl. in Mela-Cajander, op. cit. fasc. II, No. 90, fasc. IV, Nos. 80–82, sub *H. nigrans* Almqu. ex Dahlst. (l. c.).

Perennial. Stem 30–70(–100) cm high, 1–4 mm in diameter, in lower part moderately pubescent with light-colored, soft hairs 0.5–1.0 mm long, thinning upward to occasional, above scatteredly glandular (down to middle of stem), rather densely stellate-pubescent, stolons absent or short, thin, underground (var. β . *reptans* N.P.). Basal leaves 5–6, oblong or spatulate to lanceolate or narrowly lanceolate, obtuse to acute, to 23 cm long (11–12:1), entire, yellowish-green, on both sides pubescent with soft hairs 0.2–1.0 mm long, as a whole pubescence to moderate (denser beneath), with stellate down to moderate above, dense beneath (surface of leaves under magnifying glass looks like starry sky); cauline leaves 2–4(–7) (coefficient of leafiness, on average, 0.05), linear-lanceolate, acute, densely stellate-pubescent, scatteredly glandular (at least upper leaves). Inflorescence compactly umbellate, 559 later more open, with 15–40(–100) capitula; acladium 5–6(–30) mm long; peduncles glabrous (f. *calvipedunculum* N.P.) or sparsely to scatteredly (f. *hirtipedunculum* N.P.) pubescent with black hairs 0.5–1.5 mm long, scatteredly glandular, gray- or white-tomentose; floral bracts gray. Involucres 6–7 or 7–8 mm long (var. γ . *pseudocymigerum* N.P.), cylindrical-ovoid; involucral bracts somewhat broad to narrow, acute, dark, with light border, glabrous or with occasional (0–15) (f. *calvipedunculum* N.P.), or scattered (15–30) hairs 1 mm long (f. *hirtipedunculum* N.P.), with scattered, 30(15–45), glands 0.3–0.5 mm long, moderately stellate-pubescent. Corollas golden or dark yellow; stigmas yellow. Flowering June to July. (Plate XXXVI, Fig. 2.)

Dry open forests, on dry herb slopes, in meadows overgrown with shrubs, moraines, alvars, sandy glades, and old fields; prefers calcareous soils. It is the most widely distributed species of this subsection in the Soviet Union.—*European Part*: Karelia-Lapland (southern part), Dvina-Pechora (southern part), Baltic Region, Ladoga-Ilmen, Upper Volga, Volga-Kama, Upper Dnieper, Middle Dnieper, Volga-Don, Trans-Volga, Upper Don, Lower Don (?Stavropol); *Western Siberia*. Ob Region, Upper Tobol. *General distribution*: Scandinavia, Central Europe (eastern part). Described from Poznan. Type in Munich.

Note. In the material collected on Saaremaa Island (Oesel), Dahlstedt identified part as subspecies *H. hirtellicepts* Dahlst. (*Beitr. Hier.-Fl. Oesels*, 1901, 20; Zahn in *Pflzr.* IV, 280, 1319); however, the difference between *H. hirtellicepts* Dahlst. and *H. pubescens* Lindbl. is unclear. This plant, like *H. auriginans* Norrl. or *H. allochroum* Norrl., is probably a variety.

Dahlstedt split off some of the plants of *H. cymigerum* collected there, as *H. nigrans* var. *osiliense* Dahlst. (*Beitr. Hier.-Fl. Oesels*, 1901, 20). However, a comparison of these plants with the typical *H. nigrans* of Norrlin's exsiccatae did not reveal significant differences.

642. **H. suomense** Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 163; Mela-Cajander, Suom. Kasvio, 668; N.P. Hier. Mitteleur. I, 419; Zahn in Pflzr. IV, 280, 1321.—*H. suomense* Norrl. var. *griseus* Brenn. in Meddel. Fa. Fl. Fenn. 29 (1905) 140, 30 (1906) 154, pro sp.—Exs.: Norrl. Hier. exs. Nos. 90, 91; Lindb. Pl. Finl. exs. Nos. 1655, 1656.

560 Perennial. Stem 50(30–90) cm high, 2–4 mm in diameter, at base with dense, light-colored hairs 1 mm long, thinning upward, above with isolated, black hairs 1.0–1.5 mm long and to dense glands 0.5 mm long (glands, greatly thinning, found down to base of stem), densely stellate-pubescent, without stolons. Basal leaves 2–8, more or less lanceolate, acute, to 11 cm long (7:1), yellowish-green, with hairs on both sides and along midrib dense, 0.3–0.6 mm long, and along margin scattered, as a whole densely pubescent, above moderately (hairs to almost occasionally) stellate pubescent, beneath densely so; cauline leaves 2–3 (coefficient of leafiness 0.04), with scattered glands. Inflorescence compactly umbellate, later more open, with (10–)20–45 capitula; acladium 2–4(–7) mm long; peduncles glabrous, densely glandular, white-tomentose. Involucres 6–7(–8) mm long, ovate; involucre bracts somewhat broad, acute, dark, with narrow, light border, with occasional, 5(0–10), black hairs 1 mm long and scattered, 30(20–50), glands 0.3–0.4 mm long, moderately stellate-pubescent. Corollas dark yellow; stigmas yellow. Flowering June to July.

Dry bottom meadows, old fields.—*European Part*: Ladoga-Ilmen. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

643. **H. polymnoon** N.P. Hier. Mitteleur. I (1885) 474; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I, 77; Beitr. Hier.-Fl. Oesels, 21; Lindm. Svensk. Fan.-Fl. 2 ed. 597; Mela-Cajander, Suom. Kasvio, 674; Zahn in Pflzr. IV, 280, 1321; Asch. and Graebn. Synopsis, XII, I, 216.—Exs.: Norrl. Hier. exs. fasc. IV, Nos. 96–98.

Perennial. stem 30–100 cm high, 2–3 mm in diameter, with collateral stems, with scattered, light-colored hairs to 1 mm long, above with scattered glands, densely stellate-pubescent; stolons absent or underground. Basal leaves 6–11, outer obovate or spatulate, subobtuse to lanceolate or narrowly lanceolate and acute, to 21 cm long (11–18:1), green, with moderate, soft hairs 0.5–1.0 mm long, stellate pubescence scattered above, dense beneath; cauline leaves 3(1–4) (coefficient of

leafiness 0.05), linear-lanceolate, acute, with sparse glands. Inflorescence often deeply umbellate or openly paniculate, with 32(14–60) (–108) capitula; acladium 5–10(–90) mm long; peduncles glabrous or with occasional hairs 1 mm long, moderately glandular, white-tomentose; floral bracts large, leaflike, whitish. Involucres 6.5–7.0(–8.0) mm long, cylindrical-ovate; involucral bracts narrow, acute, gray; scarcely bordered, glabrous or with sparse, 16(10–25), black hairs 0.5 mm long, (var. *β. rindoicum* N.P.), densely, 53(46–70), glandular with glands 0.3 mm long, gray from down (including margins as well). Corollas dark yellow; stigmas yellow. Flowering June to July.

Glades overgrown with shrubs.—*European Part*: Baltic Region. *General distribution*: Scandinavia. Described from Sweden. Type in Munich.

Note. It differs from *H. cymigerum* Rchb. by having a deeply and loosely umbellate inflorescence, narrow leaves, and large, leaflike, whitish floral bracts.

Probably, *H. samaricum* Zahn (*Pflzr.* IV, 280, 1932, 1322) should be included here; on the basis of the very incomplete diagnosis, it is distinguished from *H. polymnoon* N.P. by broader leaves and, apparently, denser glandularity in the inflorescence, approaching var. *β. rindoicum* N.P. We were unable to see the authentic specimen, and where it is preserved is unknown (collector Ispolatov).

- 561 *Cycle 3. Curvascentia* Juxip.—Subgrex *H. curvescens* Zahn in *Pflzr.* IV, 280 (1923) 1322.—Hairs on involucral bracts entirely absent or occasional.

644. **H. curvescens** Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 166; Mela-Cajander, Suom. Kasvio, 659 (pro sp. coll.), 660; Hier. Mitteleur. I, 417; Zahn in *Pflzr.* IV, 280, 1322.—*H. microcephalum* Meinsh. Herb. Fl. Ingr. p. p.—**Exs.**: Norrl. Herb. Pil. Fenn. I (1884) No. 93; Hier. exs. f. X, no. 84.

Perennial. Stem 20–38 cm high, somewhat ascending, flexuous, at base violet, with moderate, thin, white hairs 2–3 mm long, occasional above, sparsely glandular and densely stellate-pubescent. Basal leaves 5(2–8), lingulate to narrowly lanceolate, finely-toothed, with scattered hairs 2 mm long, stellate pubescence very sparse above, to scattered beneath; cauline leaves 3–4 (coefficient of leafiness 0.08). Inflorescence umbellate-paniculate, with 24(5–68) capitula; peduncles glabrous or with occasional hairs, scatteredly glandular, gray-tomentose. Involucres 6.0–7.5 mm long; involucral bracts somewhat broad, blackish, usually glabrous or with occasional hairs, with scattered, 40(18–60),

glands 0.3–0.7 mm long, moderately stellate-pubescent. Corollas pale yellow; stigmas yellow. Flowering June to July.

Dry grassy places.—*European Part*: Baltic Region, Ladoga-Ilmen. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. It links subsections *Cymosa* and *Cymigera*. It probably is necessary to include *H. leptothyrsus* Peter (*Nachr. K. Ges. Wiss. Götting.* 2, 1893, 70; Zahn, *Hier. fl. Mosquens.* 25; *Pflzr.* IV, 280, 1321) here. It is found in the Upper Volga region and is distinguished by its smaller (5.0–5.5 mm long) involucre. Type unknown.

Two other species are also included here, *H. ensiferum* Norrl. (*Nya nord. Hier.*, 1904, 96; *Hier. exs.* IV, No. 51), collected along the Onega River (Turchasovo), and *H. fuliginascens* Norrl. (*Nya nord. Hier.* 1904, 110; *Hier. exs.* IV, No. 90), collected along the Sukhona River (Sinegoda).

Subsection 3. Cymosoprattensina Juxip.—In habit, plants resemble, in part, members [species] of section *Cymosina* and, in part, *Prattensina*, differing from both by horizontally divergent hairs at base of stem, and more or less dense glandularity in inflorescence; glands on involucre bracts are distributed more or less uniformly throughout (not crowded at tip as in *Cymigera* or at base as in *Prattensina*); leaves with more or less considerable down, especially beneath.

1. Peripheral florets dark purple on outside, orange on inside...2.
- + All florets concolored (yellow), sometimes only peripheral florets with reddish stripes on outside, or teeth of peripheral florets red.....6.
2. Plants from Carpathian Mountains and Galicia (Cycle 1. *Rubella*).....3.
- + Plants from north of European territory of Soviet Union (Cycle 2. *Norrlinniformia*).....5.
3. Involucral bracts subobtuse, like peduncles covered with up to dense dark hairs 1.5 mm long. Leaves sparsely pubescent; cauline leaves 1.....645. **H. roxolanicum** Rehm.
- + Involucral bracts subacute to acute, like peduncles sparsely to scatteredly hairy; leaves scatteredly to densely pubescent.....4.
4. Involucral bracts and peduncles scatteredly hairy; cauline leaves 2–3.....646. **H. rubricymigerum** N.P.
- + Involucral bracts and peduncles with occasional hairs; cauline leaves 1(–2).....647. **H. rehmannii** N.P.
- 5 (2). Stem at base very densely pubescent; leaves densely pubescent.....648. **H. tephroanthelium** Zahn

- + Stem at base scatteredly pubescent, like leaves; florets in part tubular.....649. **H. norrliniiforme** Pohle and Zahn
- 6 (1). Leaves stellate-pubescent on both sides; plants more or less tall.....7.
- + Leaves conspicuously stellate-pubescent mostly only beneath22.
- 7. Hairs and glands on involucre bracts (inflorescence) more or less equal in number; leaves setose with more or less long, soft bristles (1-)1.5-3.0(-5.0) mm long, (Cycle 3. *Colliniflora*)8.
- + Glands on involucre bracts many more than hairs or hairs absent; leaves pubescent with more or less short, soft hairs 0.3-1.0 mm long.....13.
- 8. Plants without stolons. Involucres 6-7 mm long; involucre bracts moderately pubescent, scatteredly glandular.....650. **H. prolongatum** N.P.
- + Plants with stolons.....9.
- 9. Stolons underground.....10.
- + Stolons above-ground, short, thick, with more or less long leaves; leaves above almost without stellate down, beneath with scattered down.....655. **H. subambiguum** N.P.
- 10. Stolons short, mostly abortive; leaves to densely stellate-pubescent.....11.
- + Stolons long, thin.....12.
- 11. Leaves moderately pubescent with short hairs 0.7-1.0 mm long; inflorescence with 6-18(-32) capitula; involucre bracts with broad, light border.....651. **H. neglectum** Norrl.
- + Leaves with scattered, long bristles 3-5 mm long, inflorescence with 50-60 capitula; involucre bracts scarcely bordered.....652. **H. giganteum** Zahn
- 563 12. Involucre bracts and peduncles with dense hairs and scattered glands (ratio of hairs to glands 2:1); involucres 7-8 mm long; pubescence of leaves to dense; stellate pubescence of leaves dense.....653. **H. pycnothyrsus** Peter
- + Involucre bracts and peduncles with occasional (to sparse) hairs, moderately glandular (ratio of hairs to glands 1:5); involucres 6.5-7.0 mm long; leaves scatteredly pubescent; stellate pubescence of leaves above very sparse, to scattered beneath.....654. **H. rusanum** Zahn
- 13 (7). Coefficient of leafiness low, 0.04-0.07; inflorescence more or less compact-umbellate (to somewhat paniculate), only later more open (Cycle 4. *Ambigua*).....14.

- + Coefficient of leafiness higher, 0.09–0.10; inflorescence deeply umbellate (spreading already at beginning of flowering); involuclral bracts glabrous (Cycle 5. *Macrantha*).....21.
- 14. Hairs and glands more or less equal; involuclral bracts with occasional hairs and glands.....656. **H. lamprophtalmum** Norrl.
 - + Glands on involuclral bracts greatly (many times) exceeding number of hairs or hairs entirely absent.....15.
- 15. Involuclral bracts hairy (at least with occasional hairs).....16.
 - + Involuclral bracts without hairs (only with glands).....19.
- 16. Hairs on involuclral bracts to sparse, glands scattered (ratio of hairs to glands 1:2 to 1:3).....657. **H. detonsum** Norrl.
 - + Hairs on involuclral bracts occasional, glands to moderate.....17.
- 17. Leaves light (glaucous) green, glossy, sparsely pubescent (cauline leaves almost completely glabrous); glands in inflorescence yellowish, dense; floral bracts whitish.....658. **H. micans** Norrl.
 - + Leaves bluish-green, dull, to scatteredly pubescent; floral bracts dark or gray.....18.
- 18. Involuclral bracts scarcely bordered; glands small, 0.3 mm long, hyaline, waxy.....659. **H. griseum** Norrl.
 - + Involuclral bracts with wide, green border; glands medium-sized, 0.5 mm long, black.....660. **H. glomeratum** (Fr.) N.P.
- 564 19 (15). Stem almost glabrous, even at base; leaves scatteredly pubescent; inflorescence with 4–8(–12) capitula, glands in inflorescence small, 0.3 mm long; leaves moderately stellate-pubescent above, densely beneath.....661. **H. haraldii** Norrl.
 - + Stem conspicuously pubescent; leaves moderately pubescent; inflorescence with large number of capitula; glands larger; leaves to sparsely stellate-pubescent above, densely beneath.....20.
- 20. Stem at base densely pubescent; involuclral bracts and peduncles with different-sized black glands 0.5–0.7 mm long; involuclres 7–8 mm long.....662. **H. vitellinum** Norrl.
 - + Stem at base scatteredly pubescent; involuclral bracts and peduncles with different-sized, yellow, fine glands 0.3–0.7 mm long; involuclres 6.0–6.5 mm long.....663. **H. luteoglandulosum** Sael. ex Norrl.
- 21 (13). Involuclres 6–7 mm long; inflorescence with (2–)10–20(–25) capitula.....664. **H. permicum** Zahn
 - + Involuclres 8–9 mm long; inflorescence with 6–15 capitula.....665. **H. conferciens** Norrl.
- 22 (6). Leaves to moderately stellate-pubescent beneath (Cycle 6. *Dubia*).....23.

- + Leaves densely stellate-pubescent beneath (hyaline-tomentose) (Cycle 7. *Polioderma*).....30.
- 23. Involucral bracts with hairs and glands; involucre 6–10 mm long.....24.
- + Involucral bracts and peduncles without hairs but densely glandular; involucre 4.5–5.0 mm long.....673. **H. floribundoides** Zahn
- 24. Hairs and glands on involucral bracts more or less equal in number.....25.
- + Glands on involucral bracts significantly (to many times) more than hairs.....28.
- 25. Hairs on involucral bracts sparse.....26.
- + Hairs on involucral bracts occasional.....27.
- 26. Involucre 6.0–7.5(–8.0) mm long.....666. **H. acrocomum** N.P.
- + Involucre 8–10 mm long....669. **H. subfloribundum** (N.P.) Dahlst.
- 27. Peduncles with occasional to sparse hairs; leaves with sparse stellate pubescence on both sides; stem 10–40 cm high; coefficient of leafiness 0.10–0.12.....667. **H. sysoleskiense** Zahn
- + Peduncles glabrous; leaves without stellate down above, mostly only along midrib beneath; stem 20–70 cm high; coefficient of leafiness 0.04–0.06.....668. **H. accline** Norrl.
- 28. Involucral bracts and peduncles with sparse hairs and scattered glands (glands 2–3 times as many as hairs); involucre small, 5.5–6.5 mm.....670. **H. microstrum** Zahn
- + Involucral bracts and peduncles with occasional hairs and scattered to moderate glands (glands 5–6 times as many as hairs).....29.
- 565 29. Leaves on both sides moderately stellate-pubescent (beneath sometimes hyaline-tomentose).....671. **H. pilipes** Sael.
- + Leaves above almost without stellate down, beneath stellate down mostly along midrib.....672. **H. floribundiforme** N.P.
- 30 (22). Inflorescence openly paniculate, with 3–17 capitula; involucre 6–8 mm long; plants without stolons.....674. **H. transbalticum** Dahlst.
- + Inflorescence shallowly forked, with 2–4 capitula; involucre 8–9 mm long; plants with short, thin, above-ground or underground stolons.....675. **H. apatelioides** Zahn

Cycle 1. **Rubella** Juxip.—*H. rubellum* Zahn in Schinz and Keller, Fl. Schweiz. ed. 2, I (1905) 552; nec N.P.—*H. cruentum* N.P. Hier. Mitteleur. I (1885) 455.—*H. cymosum-aurantiacum* N.P. l. c.—*H. rubellum* grex *H. rehmannii* Zahn in Pflzr. IV, 280 (1923) 1342, ut *H. vaillantii-aurantiacum* Zahn.—*H. guthnickianum* grex *H. rehmannii*

Zahn in Asch. and Graebn. Synopsis, XII, I (1929) 246.—In habit, resembling *Cymigera*, but florets purple on outside and orange inside; stigmas dark; Upper Dniester Region.

645. **H. roxolanicum** Rehm. in Oester. Bot. Zeitschr. (1873) 151; N.P. Hier. Mitteleur. I, 461; Zahn in Pflzr. IV, 280, 1343; Asch. and Graebn. Synopsis, XII, I, 246.

Perennial. Stem 25–40 cm high, 2–3 mm in diameter, at base with sparse hairs, becoming denser upward, above with rather dense, dark hairs 1.5–2.5 mm long, above with scattered, quickly thinning glands, scatteredly stellate-pubescent; stolons thin, short, often underground. Basal leaves broadly lanceolate, acute, glaucescent, on both sides with sparse hairs 1.5–2.0 mm long, 1.5 mm long along margin, sparse stellate down above, moderate beneath; cauline leaves 1 (coefficient of leafiness 0.03), in lower part of stem. Inflorescence compactly umbellate with 10–20 capitula; acladium 2–5 mm long; peduncles with dense dark hairs 1.5 mm long, densely glandular, white-tomentose; floral bracts dark. Involucres 6 mm long, cylindrical; involucral bracts narrow, subobtus, dark, scarcely bordered, with dense dark hairs 1.5 mm long, scatteredly glandular and scatteredly stellate-pubescent. Florets orange, peripheral ones on outside purple. Flowering June to July.

Mountains, descending to valleys.—*European Part*: Upper Dniester. Endemic. Described from Carpathian Mountains. Type in Lvov? Krakow?

646. **H. rubricymigerum** N.P. Hier. Mitteleur. I (1885) 462; Zahn in Pflzr. IV, 280, 1343; Asch. and Graebn. Synopsis, XII, I, 247.

566 Perennial. Stem 45–55(–80) cm high, 2–3 mm in diameter, at base with scattered, higher up sparse, in upper part again denser hairs 1.0–1.5 mm long, densely glandular above, thinning downward, densely stellate-pubescent, stolons elongated, thin, often numerous. Basal leaves oblong-lanceolate, subacute, to 20 cm long, glaucescent, on both sides with hairs, 1.5–2.0 mm long above, 0.5 mm long beneath and along margin, to dense or scattered (var. *β. blockii* Wol.), on both sides with scattered stellate down; cauline leaves 2–3 (coefficient of leafiness 0.05), acute. Inflorescence compactly umbellate, with 15–20 capitula or umbellate-paniculate, many-headed (var. *β. blockii* Wol.); acladium 3–4 mm long; peduncles scatteredly pubescent, densely glandular, white-tomentose; floral bracts dark. Involucres 6.5 mm long, cylindrical; involucral bracts narrow, subacute, blackish, with very narrow, lighter border, with scattered, black hairs 1 or 0.5 mm long (var. *β. blockii* Wol.) and densely glandular, moderately stellate-pubescent. Florets

orange; peripheral on outside purple. In habit, resembling *Cymigera*. Flowering June to July.

Mountains, to 1,260 m.—*European Part*: Upper Dniester. *General distribution*: Central Europe (Carpathian Mountains). Endemic. Described from Carpathian Mountains. Type in Munich.

647. **H. rehmannii** N.P. Hier. Mitteleur. I (1885) 457; Zahn in Pflzr. IV, 280, 1343; Asch. and Graebn. Synopsis, XI, I, 247 (sub *H. eurehmannii* Zahn).

Perennial. Stem 27–40(–50) cm high, 1.5–2.0 mm in diameter, from base with dense, light-colored hairs 2.0–2.5 mm long; more scattered above, above densely glandular, glands thinning downward, scatteredly stellate-pubescent; stolons thin. Basal leaves oblong-lanceolate, obtuse to subacute, light green, on both sides and along margin with moderate hairs 1 mm long, denser, 2 mm long beneath along midrib, without stellate down above, with sparse down beneath; cauline leaves 1(–2) (coefficient of leafiness 0.04). Inflorescence somewhat openly umbellate, with 6–15(–20) capitula; acladium 5–6 mm long; peduncles with occasional hairs, densely glandular, gray from down; floral bracts gray, with light border. Involucres 6–7 mm long, ovate; outer involucral bracts narrow, inner somewhat broad, acute, black, somewhat light-bordered and with occasional, black, hairs 1–2 mm long, scatteredly glandular, with sparse stellate down (margin glabrous). Florets yellowish-orange; peripheral florets on outside with purple stripes. Flowering June to July.

Mountains, descending to valleys.—*European Part*: Upper Dniester. *General distribution*: Central Europe. Described from Stanislavov. Type in Munich.

Cycle 2. Norrliniiformia Juxip.—*H. norrliniiforme* Pohle and Zahn in Allgem. Bot. Zeitschr. XIII (1907) 111; Pflzr. IV, 280, 1356.—Plants similar to species of cycle *Rubella* (and no doubt closely related), found in north of European territory of Soviet Union. Peripheral florets purple on outside and orange inside; stigmas dark.

648. **H. tephrranthelum** Zahn in Sched. HFR VII (1911) 88; Pflzr. IV, 280, 1356.—*Exs.*: GRF No. 2205a, b (pro ssp. *H. aurantiaci*).

567 Stem 30–45 cm high, 2–3 mm in diameter, at base with very dense bristles 1–2 mm long, sharply thinning upward and sparse, having dark base, scatteredly glandular above, to densely stellate-pubescent almost entire length; stolons short, thin, underground. Basal leaves 2–3, lanceolate, subobtuse, to subacute, long-tapered to petiole, very finely toothed, yellowish-green, to 25 cm long (6–10:1), densely hairy

on both sides and along midrib with hairs 0.6–1.0(–2.0) mm long, sparsely along margin, as a whole densely pubescent, above almost without stellate down, beneath (mostly along midrib) scatteredly stellate-pubescent, sometimes tips with occasional glands; cauline leaves 1–3 (coefficient of leafiness 0.05), lanceolate, subacute, very densely short-pubescent with hairs 0.6–1.0 mm long. Inflorescence umbellate-paniculate, with 4–12(–25) capitula; acladium 10 mm long; peduncles with occasional, dark, hairs 3 mm long, moderately glandular with glands 0.4 mm long, gray-tomentose. Involucres 7 mm long, ovate; involucre bracts somewhat broad, subacute, dark, with green border, their tips often reddish, with sparse to scattered, 22(14–26), hairs 2.5–3.0 mm long (tips of hairs light-colored), sparse, 18(14–21), black glands 0.4 mm long; with sparse stellate down. Florets orange; peripheral florets on outside purple; stigmas dark. Flowering July.

Peat meadows.—*European Part*: Dvina-Pechora. Endemic. Described from Syktyvkar District.

Note. According to Zahn, this species conforms to the formula *H. aurantiacum-glomeratum*, and is similar to *H. norrliniiforme* Pohle and Zahn.

Apparently, *H. pericaustum* Norrl. (*Pilos. bor.*, 1895, 49; *Pflzr.* IV, 280, 1357) should be included here. It is distinguished mainly by the less dense pubescence over the whole plant. Its variety (var. *β. aleurites* Norrl. *Nya nord. Hier.* II, 1912, 43) was found in the vicinity of Lake Ladoga. The type is in Helsinki.

649. **H. norrliniiforme** Pohle and Zahn in *Allgem. Bot. Zeitschr.* XIII (1907) 111; Zahn in *Pflzr.* IV, 280, 1356.

Perennial. Stem 45 cm high, 1.5–2.0 mm in diameter, at base with scattered, light-colored hairs 1–2 mm long, sparse and dark above, above sparsely glandular, scatteredly stellate-pubescent; stolons apparently underground(?). Basal leaves 4–6, lanceolate, partly subobtusely, finely toothed, yellowish-green, above with sparse hairs, 1.0–1.5 mm long, along margin and beneath with scattered and along midrib with moderate hairs, above without stellate down, beneath with scattered down; cauline leaves 1(–2) (coefficient of leafiness 0.03), scatteredly stellate-pubescent beneath. Inflorescence compactly umbellate, its lower branch sometimes remote, with 6–12(–15) capitula; acladium 5–8 mm long; peduncles with occasional hairs, scatteredly short-glandular, gray-pubescent. Involucres 7 mm long, ovate; involucre bracts narrow, subacute, with scattered hairs 1 mm long (with light-colored tip), scatteredly glandular, gray from stellate down. Florets partly tubular; peripheral ones on outside somewhat reddish; stigmas dark. Flowering June to July.

Riverbanks.—*European Part*: Dvina-Pechora. Endemic. Described from White Sea Coast (Pushlakhta). Type unknown.

Cycle 3. Colliniflora Juxip.—*Grex H. colliniflorum* Zahn in Pflzr. IV, 280 (1923) 1351.—*H. colliniflorum* Hayek, Fl. Steierm. II (1914) 734.—Leaves pubescent mostly with hairs (1–)1.5–3.0(–5.0) mm long; hairs and glands on involucre bracts mostly equal in number.

650. **H. prolongatum** N.P. Hier. Mitteleur. I (1885) 471; Zahn in Pflzr. IV, 280, 1352; Asch. and Graebn. Synopsis, XII, I, 256.—*Exs.*: Schweinf. Hern. Fl. Ingric. No. 375 p. p.

Perennial. Stem 65 cm high, 2–3 mm in diameter, at base with scattered, light-colored hairs 1–2 mm long, thinning upward to sparse, with occasional glands in upper half, scatteredly to sparsely stellate-pubescent, without stolons. Basal leaves spatulate-narrowly lanceolate, obtuse to acute, yellowish-green, as a whole scatteredly pubescent, above with bristles 2 mm long, above very sparsely stellate-pubescent, beneath to scatteredly so; cauline leaves 3 (coefficient of leafiness 0.05), eglandular. Inflorescence openly umbellate-paniculate, with up to 30 capitula; acladium short, 2–3 mm long; peduncles with up to scattered hairs and sparse to scattered glands, whitish-tomentose; floral bracts dark gray. Involucres 6–7 mm long, cylindrical; involucre bracts narrow, acute, black, with narrow, light border, with moderate black hairs 1.5 mm long, sparsely to scatteredly glandular, scatteredly (along margin sparsely) stellate-pubescent. Flowering June to July.

European Part: Ladoga-Ilmen. *General distribution*: Central Europe. Described from Silesia. Type in Munich.

651. **H. neglectum** Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 160 (sub *Pilosella neglecta*); Mela-Cajander, Suom. Kasvio, 667; N.P. Hier. Mitteleur. I, 470; Zahn, Hier. fl. Mosquens. 30; Pflzr. IV, 280, 1351.—*Pilosella neglecta* Norrl. Herb. Pilos. Fenn. I (1884) No. 88.—*Exs.*: GRF Nos. 1278a, b, 1825; Norrl. Hier. exs. fasc. V, Nos. 43, 44.

Perennial. Stem 40–80 cm high, 2–4 mm in diameter, at base violet and moderately covered with light-colored, soft hairs 1.5–2.0 mm long, gradually thinning upward, dark above, as a whole densely pubescent; above scatteredly glandular and scatteredly stellate-pubescent; stolons absent or short, thin, mostly abortive. Basal leaves (5) oblong-lanceolate to narrowly lanceolate, to 18 cm long (8–11:1), acute, indistinctly finely toothed, dark green, hairs above and along margin scattered, beneath moderate (0.7–1.0 mm long), along midrib dense, 2
569 mm long, as a whole moderately pubescent, above moderately stellate-pubescent, beneath rather densely so (hyaline-tomentose); cauline

leaves 2(-3) (coefficient of leafiness 0.04), lanceolate, acute (8-10:1) with occasional glands at tips. Inflorescence umbellate-paniculate, more or less open, with 6-18(-32) capitula; acladium 6-10 mm long; peduncles with occasional, black hairs 1-2 mm long, densely glandular with glands 0.4 mm long, gray from stellate down; floral bracts gray. Involucres 7.5-9.0 mm long, cylindrical; involucral bracts somewhat broad, acute, blackish, with wide, light-colored border, with sparse to scattered, 18(14-32), dark hairs 1.5 mm long and equally scattered, 18(20-30), glands 0.5 mm long, uniformly distributed, rather densely stellate-pubescent (sparsely along margin). Florets yellow; all ray florets; stigmas yellow. Flowering June to July.

Forest edges, wet meadows.—*European Part*: Dvina-Pechora (southern part), Ladoga-Ilmen, Upper Volga. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki; cotype in Munich.

Note. This species is a form transitional to *Cycle Colliniflora* (between *Cymosa* and *Pratensina*), noted by Naegeli and Peter.

Apparently, *H. illudens* Norrl. (*Pil. bor.* 1895, 66; Mela-Cajander, *Suom. Kasvio*, 667; *Pflzr.* IV, 280, 1351.—**Exs.**: Norrl. *Hier. exs. f.* II, No. 87) should be included here. It was described from the shores of Lake Ladoga and is separated from *H. neglectum* only by its tubular florets. Type in Helsinki.

652. **H. gigantea** Zahn, *Hier. fl. Mosquens.* (1911) 30; *Pflzr.* IV, 280, 1352.

Perennial. Stem to 90 cm high, 3-5 mm in diameter, densely covered below with bristles 1-2 mm long, sparsely so above with dark bristles 3 mm long, moderately glandular in upper part with black glands, thinning downward to middle of stem, moderately stellate-pubescent; stolons short, underground. Basal leaves large, oblong, obtuse to lanceolate and acute, as a whole scatteredly covered with bristles 3-5 mm long, on both sides scatteredly stellate-pubescent; cauline leaves 3-4 (coefficient of leafiness 0.04), lanceolate, acute, somewhat glandular. Inflorescence umbellate, later open, with 50-60 capitula; acladium 15 mm long; peduncles with sparse hairs, rather densely glandular, gray-tomentose. Involucres 7-8 mm long, ovate-cylindrical; involucral bracts somewhat narrow, dark, with somewhat light border, and with scattered hairs 1-3 mm long, scatteredly glandular, scatteredly stellate-pubescent. Florets dark yellow. Flowering June to July.

Meadows.—*European Part*: Upper Volga. Endemic. Described from vicinity of Moscow. Type unknown.

653. **H. pycnothyrsus** Peter in Nachr. K. Ges. Wiss. Götting. 2 (1893) 77; Zahn, Hier. fl. Mosquens. 31; Pflzr. IV, 280, 1352.

570 Perennial. Stem 50–80 cm high, in lower part densely covered with hairs 2–3 mm long, thinning upward, sparsely glandular above, to densely stellate-pubescent; stolons long, thin, underground. Basal leaves oblong, rather densely covered with bristles 1.5–2.5 mm long, moderately stellate-pubescent above, densely beneath; cauline leaves 3–4 (coefficient of leafiness 0.05), lanceolate, glandular. Inflorescence compactly umbellate with 15–40 capitula; peduncles densely pubescent, scatteredly glandular, gray-tomentose. Involucres 7–8 mm long; involucral bracts with dense hairs, scatteredly glandular, densely stellate-pubescent. Flowering June to July.

Meadows and forest edges.—*European Part*: Upper Volga. Endemic. Described from vicinity of Moscow. Type unknown.

Note. This description is based on Peter's incomplete diagnosis.

654. **H. rusanum** Zahn in Pflzr. IV, 280, 1351.—*H. anceps* Zahn, Hier. fl. Mosquens. (1911) 30.

Perennial. Stem 50 cm high, at base with scattered hairs 1.5–2.5 mm long, thinning and dark upward, above scatteredly glandular, scatteredly stellate-pubescent, stolons long, thin, underground. Basal leaves narrowly lanceolate, acute, on both sides with scattered hairs 1.5–2.5 mm long, very sparsely stellate-hairy above, scatteredly so beneath, cauline leaves 2 (coefficient of leafiness 0.04), with occasional glands at tips. Inflorescence compact-umbellate with 8–12 capitula; peduncles with occasional hairs, scatteredly glandular, white-tomentose. Involucres 6.5–7.0 mm long; involucral bracts narrow, somewhat dark, scarcely bordered, with occasional to sparse, hairs 1.5–2.5 mm long, moderately glandular, scatteredly stellate-hairy. Flowering June to July.

Meadows, forest edges, old fields.—*European Part*: Upper Volga. Endemic? Described from outskirts of Moscow. Type unknown.

655. **H. subambiguum** N.P. Hier. Mitteleur. I (1885) 465; Zahn in Pflzr. IV, 280, 1350; Asch. and Graebn. Synopsis, XII, I, 253.—**Exs.**: Zahn, Hier. Europ. No. 525.

Perennial. Stem 40–70 cm high, 3–4 mm in diameter, with scattered, light-colored (above dark) hairs 0.5–1.0 mm long, scatteredly glandular above, to densely stellate-hairy; stolons mostly very short, thick, above-ground, long-leaved. Basal leaves oblong to lanceolate, obtuse to acute, yellowish-green, on both sides moderately short-pubescent (1 mm long), almost without stellate down above, with up to scattered down beneath; cauline leaves 2 (coefficient of leafiness 0.03), lanceolate, acute, with sparse glands at tips. Inflorescence compact-

umbellate, later open, with 20–25 capitula; acladium 2–5 mm long; peduncles with moderate hairs 1 mm long, scatteredly glandular, gray from down; floral bracts dark gray. Involucres 7.5–8.0 mm long, cylindrical; involucral bracts narrow, acute, blackish, with narrow, green
 571 border, with scattered, dark hairs 0.5 mm long, scatteredly glandular, to moderately stellate-pubescent (margins glabrous). Florets dark yellow! Stigmas yellow. Flowering June to July.

Meadows.—*European Part*: Upper Dnieper. *General distribution*: Central Europe (eastern part). Described from Silesia. Type in Munich.

Cycle 4. Ambigua Juxip.—*H. ambiguum* Ehrh. Beitr. V (1790) 178; Griseb. Comm. destr. Hier. gen. 11; Zahn in Pflzr. IV, 280, 1346; Asch. and Graebn. Synopsis, XII, I, 251.—*H. glomeratum* Froel. in DC. Prodr. VII (1838) 207; N.P. Hier. Mitteleur. I, 463, 465, 812; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I, 90; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1083; Syreistsch. Fl. Mosk. Gub. III, 355; Zahn, Hier. fl. Mosquens. 29.—*H. glomerata* Norrl. in Mela-Cajander, Suom. Kasvio, (1906) 662.—*H. cymosum-collinum* N.P. l. c.—*H. cymosum-pratense* Zahn l. c.—*H. dubium* L. Sp. pl. ed. 2 (1763) 1125 p. p.—Stem without or with thin, underground (very rarely with aerial) stolons, mostly as if rudimentary, with horizontally spreading, soft bristles 0.5–3.0 mm long, as a whole moderate to very dense (denser in lower part); leaves on both sides with more or less short (0.3–1.0 mm) bristles, sparsely to scatteredly stellate-pubescent above, scatteredly to densely beneath; inflorescence pseudo-umbel or pseudo-panicle; involucres 6–9 mm long; glands on involucral bracts more or less uniformly distributed.

The type of the cycle *H. ambiguum* Ehrh. was collected by Ehrhart from the vicinity of Uppsala (Sweden).

Contradictions exist regarding the systematic position of cycle *Ambigua*. Almost all systematists consider its position as conforming to the formula *H. cymosum* L. s. 1.—*H. pratense* Tausch s. 1. However, in this context, one must bear in mind that both of these members from two sections, in turn, are split into distinctly different subsections: *Cymosa* (*H. cymosum* L. s. str.) and *Cymigera* (*H. vaillantii* Tausch s. str.), on the one hand, and *Praticola* (*H. eu-pratense* Zahn) and *Silvicola* (*H. onegense* Norrl.), on the other. In view of this, the plants usually combined under the name *H. ambiguum* Ehrh., in fact, could be the products of four combinations: 1) *Cymosa-Praticola*, 2) *Cymosa-Silvicola*, 3) *Cymigera-Praticola*, and 4) *Cymigera-Silvicola*. Of these, the first combination would include the long-pubescent forms, the last combination—exclusively, the short-pubescent forms, while the second and the third combinations could represent the medium forms. In the Soviet Union, the last combination is the most common, but in the

western floristic regions the presence of the members of the first combination also is possible; species of the second and the third combinations occur to a much lesser extent.

In view of the above-mentioned facts, the exceptional difficulty in distinguishing species of *Ambigua* from those of *Cymigera* becomes understandable. This circumstance has been pointed out by many authors (Naegeli and Peter, Zahn, Omang, and others.)

- 572 656. **H. lamprophthalmum** Norrl. Nya nord. Hier. I (1904) 107; Zahn in Pflzr. IV, 280, 1350.

Perennial. Stem 55–65 cm high, 1.5–2.0 mm in diameter, moderately short-setose in lower part, with occasional hairs and occasional glands above, moderately stellate-pubescent; without stolons. Basal leaves oblong-spatulate, lingulate to lanceolate, almost entire, glaucous-bluish-green, pale, dull, as a whole very sparsely short-setose, sparsely stellate-pubescent above, scatteredly beneath; cauline leaves 3 (coefficient of leafiness 0.06), narrowly lanceolate, with sparse, short hairs, densely stellate-pubescent and with occasional yellow glands along margin and beneath. Inflorescence paniculate-umbellate, many-headed; acladium 5 mm long; peduncles with occasional, short, gray hairs and scattered, very small, light-colored glands, gray-tomentose. Involucres 6.5 mm long, ovate; involucre bracts somewhat broad, obtuse to acute, outer light-bordered, with occasional hairs and occasional, small glands, up to densely stellate-pubescent. Florets very light sulfur-yellow; ligules undivided (not incised). Flowering June to July.

Dry sunny slopes.—*European Part*: Dvina-Pechora (southern part). Endemic? Described from banks of Sukhona River. Type in Helsinki.

Note. It is close to *H. prolongatum* N.P. but differs from it by having very sparse hairs and glands on the involucre bracts and short hairs.

657. **H. detonsum** Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 156; Mela-Cajander, Suom. Kasvio, 666; N.P. Hier. Mitteleur. I, 469; Zahn in Pflzr. IV, 280, 1349; Asch. and Graebn. Synopsis, XII, I, 255.—**Exs.:** Norrl. Herb. Pilos. Fenn. No. 87; Hier. exs. fasc. Nos. 55, 56; GRF No. 1277.

Perennial. Stem 30–75 cm high, 2–3 mm in diameter, violet at base, with scattered, light-colored hairs 0.5–1.0 mm long, more conspicuous at base, scatteredly glandular above, scatteredly stellate-pubescent; stolons absent (or underground). Basal leaves 5(2–7), oblong-spatulate, with rounded tip, to oblong-lanceolate, short-acuminate (8–10:1); light gray-green, entire, scatteredly pubescent above and along margin, moderately beneath, densely so beneath along midrib, as a whole

moderately pubescent with hairs 0.5–1.0 mm long, sparsely stellate-pubescent above, sparsely beneath; cauline leaves (1–)2–3 (coefficient of leafiness 0.04), lanceolate (11:1), on both sides with moderate stellate down, with occasional glands at tips. Inflorescence somewhat openly umbellate, with 8–25 capitula; acladium 7–11 mm long, peduncles almost glabrous, with scattered glands 0.3 mm long, gray-tomentose; floral bracts dark, light-bordered. Involucres 8–9 mm long, cylindrical; involucre bracts somewhat broad, acute, black, with wide green border, with sparse, 11(6–18), dark hairs 0.5–1.0 mm long and scattered, 29(18–60), glands 0.3 mm long, with moderate stellate down (margins glabrous). Florets dark yellow. Flowering June to July.

Meadows.—*European Part*: Ladoga-Ilmen, Volga-Don(?). *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. Apparently, *H. glomeruliferum* N.P. (*Hier. Mitteleur.* I, 1885, 468; *Pflzr.* IV, 280, 1350; Asch. and Graebn. *Synopsis*, XII, I, 253) should be referred here. It was described from St. Petersburg (maybe from the cultivated specimen in the St. Petersburg Botanical Garden? And maybe still the only specimen?). The type is in Munich.

658. **H. micans** Norrl. *Nya nord. Hier.* I (1904) 97; Zahn in *Pflzr.* IV, 280, 349.—**Exs.**: Norrl. *Hier. exs. fasc.* IV, No. 57.

Perennial. Stem 40 cm high, 1.5–2.0 mm in diameter, light green, pale yellow below inflorescence, at base with sparse bristles 0.5–1.0 mm long, bristles occasional upward, densely glandular above with yellowish glands, gradually thinning downward, scatteredly stellate-pubescent; without stolons. Basal leaves lingulate to narrowly lanceolate-lingulate, acute, with remote fine teeth, bright and light glaucous, lustrous, as a whole sparsely short-hairy, sparsely stellate-pubescent above, moderately so beneath; cauline leaves 2–3 (coefficient of leafiness 0.06), narrowly lanceolate, almost glabrous but densely (almost tomentosely beneath) stellate-pubescent, with occasional glands. Inflorescence paniculate, with 6–10 capitula; peduncles with occasional, short, gray bristles, densely glandular with yellowish, alternately medium and long glands with blackish base, gray-tomentose; floral bracts whitish. Involucres 8.5 mm long; involucre bracts linear-lanceolate, obtuse to subacute, blackish, with occasional black hairs having light-colored tips, with dense yellowish glands, moderately stellate-pubescent. Corollas and stigmas yellow.

Herb slopes.—*European Part*: Dvina-Pechora. Endemic. Described from banks of Onega River (Turchasovo). Type in Helsinki.

659. **H. griseum** Norrl. *Anteckn. öfv. Finl. Pilos.* I (1884) 155; Mela-Cajander, *Suom. Kasvio*, 664; Zahn in *Pflzr.* IV, 280, 1348; Asch. and

Graebn. synopsis, XII, I, 255.—*H. detonsum* γ . *griseum* N.P. Hier. Mitteleur. I (1885) 470; Zahn, Hier. fl. Mosquens. 30.—**Exs.:** Norrl. Pil. Fenn. I, Nos. 85, 86; Hier. exs. fasc. IV, No. 71, *typicum* and var. ζ . *abruptum* Norrl. fasc. IV, No. 68, var. δ . *oppletum* Norrl.

Perennial. Stem 30–65(–105) cm high, 2–3 mm in diameter, in lower part moderately short-setose with bristles 0.5–1.0 mm long, thinning upward to occasional, moderately glandular above, greatly thinning toward base, sparsely to scatteredly stellate-pubescent; stolons absent. Basal leaves oblong to lanceolate-lingulate, rounded or subobtusate, 574 fine-toothed, on both sides with scattered hairs 0.5 mm long, with hairs 1 mm long beneath along midrib, with sparse stellate down on both sides; cauline leaves 3–5 (coefficient of leafiness 0.05), lanceolate, scarcely glandular. Inflorescence paniculate-umbellate, later open, with 8–25 capitula; acladium 7–11 mm long; peduncles with occasional or sparse (var. *oppletum* Norrl.), light-colored hairs, rather densely glandular with fine, hyaline glands, gray-tomentose; floral bracts dark. Involucres 7.0–7.5 mm long, cylindrical-ovate; involucre bracts somewhat broad, outer subobtusate, inner acute, dark, scarcely-bordered, often without or with sparse, 5(3–9), hairs 0.5–1.0 mm long (var. *oppletum* Norrl.), scatteredly, 26(25–28), glandular, glands 0.5 mm long, sparsely stellate-pubescent. Florets dark yellow; stigmas yellow or somewhat dark (var. *oppletum* Norrl.). Flowering June to July.

Dry grassy places.—*European Part:* Dvina-Pechora (southern part), Ladoga-Ilmen, Upper Volga. *General distribution:* Scandinavia. Described from Finland. Type in Helsinki.

Note. Evidently, *H. reflorescens* Norrl. (*Nya nord. Hier.* I, 1904, 108; Mela-Cajander, *Suom. Kasvio*, 667; *Pflzr.* IV, 280, 1348.—**Exs.:** Norrl. *Hier. exs. fasc.* IV, No. 72), described from the banks of Onega Lake (Sennaya Inlet), is the autumn race of this species. It is distinguished by its robust size, number of cauline leaves, 3–4(–6), and abundant, 20–40(–80), capitula. Type is in Helsinki.

660. **H. glomeratum** (Fr.) N.P. Hier. Mitteleur. I (1885) 466; Norrl. in Mela-Cajander, *Suom. Kasvio*, 665; Zahn in *Pflzr.* IV, 280, 1347; Asch. and Graebn. Synopsis, XII, I, 254.—*H. glomeratulum* Almqu. ex Dahlst. Bidr. Sydostr. Sverig. Nier.-Fl. I (1890) 95.—**Exs.:** Fries, *Herb. norm.* XIII, No. 11; Hier. Europe. No. 34; Dahlst. *Hier. exs.* I, No. 25; III, No. 13; Hier. Scand. VIII, No. 85, 86, XVI, nos. 75, 2214g.

Perennial. Stem 40–75 cm high, 3–5 mm in diameter, dark above, with scattered hairs 0.5–1.0 mm long in lower part, thinning upward to occasional, to scatteredly glandular above, moderately stellate-pubescent; often with runners or petiolate rosettes, frequently with short, thin, rudimentary, as it were, stolons. Basal leaves 2–6, outer short,



spatulate, rounded-obtuse, others to long (20 cm), lanceolate-spatulate or narrowly lanceolate (10–16: 1), subacute to acute, glaucescent, with sparse hairs 0.5 mm long on both sides and along margin, scatteredly hairy beneath along midrib with hairs 1 mm long, as a whole scatteredly-pubescent, sparsely stellate-pubescent above, sparsely so beneath; cauline leaves (2–)3–4 (coefficient of leafiness 0.05), narrowly
 577 lanceolate, acute, scarcely glandular. Inflorescence umbellate-paniculate, crowded, later open, with (5–)10–40 capitula; acladium 3–10 mm long; peduncles glabrous or with occasional dark hairs, scatteredly glandular, gray-tomentose; floral bracts dark or gray. Involucres 7–8 mm long, cylindrical-ovate; involucre bracts somewhat broad, acute, dark, with wide green border, glabrous or with occasional, (0–5), hairs 1.0 mm long (f. *hirtius* Dahlst.), scatteredly (30–40) glandular, glands 0.5 mm long, scatteredly stellate-pubescent (margins glabrous). Florets light yellow; stigmas yellow. Flowering June to July. (Plate XXXVIII, Fig. 1.)

Open, dry, grassy places.—*European Part*: Dvina-Pechora, Baltic Region, Ladoga-Ilmen, Upper Volga, Trans-Volga, Upper Dniester. *General distribution*: Scandinavia, Central Europe. Described from Sweden. Type in Munich.

Note. Apparently, *H. pseudorphnodes* Zahn.,—*H. orphnodes* Norrl. (*Nya nord. Hier.* I, 1904, 104; Zahn in *Pflzr.* IV, 280, 1347), described from the banks of the Svir River, should be included here. Type is unknown.

661. **H. haraldii** Norrl. *Nya nord. Hier.* I (1904) 98; Mela-Cajander, *Suom. Kasvio*, 664; Zahn in *Pflzr.* IV, 280, 1348.—**Exs.**: Norrl. *Hier. exs. fasc.* IV, Nos. 58–60; GRF No. 1813.

Perennial. Stem 30–60 cm high, 2–3 mm in diameter, almost glabrous or with occasional, very short hairs, moderately glandular above, glands 0.3 mm long, quickly thinning downward, but occasional glands down to stem base, scatteredly stellate-pubescent, without stolons (or sometimes with rudimentary). Basal leaves 3–7, oblong-spatulate or lingulate to lanceolate, subobtuse to 10 cm long (8–9:1), yellowish-green, entire, on both sides and along midrib moderately pubescent, along margin sparsely and as a whole scatteredly pubescent with hairs 0.3–0.6 mm long, moderately stellate-pubescent above, rather densely so beneath; cauline leaves (1–)2–3 (coefficient of leafiness 0.05), lanceolate, acute (11:1), less pubescent than basal leaves, but more densely stellate-pubescent. Inflorescence umbellate, with 4–8(–12) capitula; acladium 5 mm long; peduncles glabrous, sparsely glandular, gray-tomentose. Involucres 6–7 mm long; involucre bracts narrow, acute,

dark, mostly glabrous (sometimes with occasional (1–2), short, black hairs), with scattered, 43(32–55), glands 0.3 mm long, scatteredly stellate-pubescent. Florets and stigmas yellow. Flowering June to July.

Sandy glades, with sparse grass stand.—*European Part*: Ladoga-Ilmen. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

662. **H. vitellinum** Norrl. Herb. Mus. Fenn. ed. 2 (1889) 153; Mela-Cajander, Suom. Kasvio, 666; Zahn in Pflzr. IV, 280, 1350.—*Exs.*: Norrl. Hier. exs. fasc. IV, Nos. 53, 54; Lindb. Pl. Finl. exs. No. 1647.

578 Perennial. Stem 50–70 cm high, 2–3 mm in diameter, densely pubescent below with short hairs, quickly thinning upward, scatteredly glandular and scatteredly stellate-pubescent above; without stolons. Basal leaves 3–4, scarcely fine-toothed, narrow (8:1), acute, light green, scatteredly pubescent above with hairs 0.5–1.0 mm long, densely so beneath and along midrib, sparsely along margin, as a whole to moderately pubescent, almost without stellate down above, beneath to dense. Cauline leaves 2–3 (coefficient of leafiness 0.04), lanceolate, acute, above moderately stellate-pubescent, beneath densely so, sparsely glandular at tip. Inflorescence umbellate, with 7–20 capitula; acladium 10 mm long; peduncles with occasional to sparse, dark hairs or glabrous (f. *subepilosum* Norrl.), moderately glandular, gray-tomentose. Involucres 7–8 mm long, ovate; involucre bracts narrow, subobtusate, outer with pale border, with sparse, short hairs or almost without hairs (0–2), moderately, 50(40–60), glandular with small or large (0.7 mm-long) glands (f. *subepilosum* Norrl.), scatteredly stellate-pubescent. Florets dark yellow; stigmas yellow. Flowering June to July.

Meadows.—*European Part*: Karelia-Lapland, Ladoga-Ilmen (northern part). *General distribution*: Scandinavia. Described from Karelia. Type in Helsinki.

663. **H. luteoglandulosum** Sael. ex Norrl. Pilos. bor. (1895) 64; Mela-Cajander, Suom. Kasvio, 666; Zahn in Pflzr. IV, 280, 1350.—*Exs.*: Norrl. Hier. exs. fasc. V, Nos. 41, 42.

Perennial. Stem 30–70 cm high, 2–3 mm in diameter, at base with scattered hairs 1 mm long, above glabrous, moderately or rather densely glandular above with large (0.5–1.0 mm-long) glands, quickly thinning downward, scatteredly stellate-pubescent; stolons (1–3) weakly developed, partly underground. Basal leaves 5–6, outer small (6–8: 1), inner longer, to 15 cm, lanceolate, narrow (13–14: 1), acute, with very fine teeth, clearly glaucous, with hairs, scattered above, moderate beneath,

0.3–0.5 mm long, hairs dense beneath along midrib, 0.5–0.7 mm long, sparse along margin, as a whole moderately pubescent, sparsely stellate-pubescent above, densely so beneath; cauline leaves 3–4 (coefficient of leafiness 0.07), narrowly lanceolate to linear (12–19:1), acute, scatteredly glandular toward tip. Inflorescence umbellate, with 18–30 capitula, some abortive; acladium 10 mm long; peduncles glabrous, moderately glandular, glands 0.3–1.0 mm long, white-tomentose. Involucres 6.0–6.5 mm long, cylindrical; involucre bracts narrow, acute, dark, scarcely bordered, almost glabrous hairs (0–1), moderately, 50(40–65), glandular, glands fine, yellow, 0.3–0.7 mm long, crowded toward tip, scatteredly stellate-pubescent; ligules lacerate. Flowering June to July.

Open meadows, slopes of granitic rocks.—*European Part*: Ladoga-Ilmen (Sortavala). *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Cycle 5. Macranthela Juxip.—*H. macranthelum* N.P. Hier. Mitteleur. I (1885) 473; Zahn in Pflzr. IV, 280, 1353; Asch. and Graebn. Synopsis, 579 XII, I, 256.—*H. cymosum* var. *paradoxum* Lindeb. in Hartm. Handb. ed. 11 (1879) 39.—*Macranthela* Norrl. in Mela-Cajander, Suom. Kasvio. (1906) 673, p. p.—*H. ambiguum* > *pilosella* Zahn, l. c.—Stem 20–55 cm high, densely stellate-pubescent; inflorescence deeply umbellate or openly paniculate, with (2–)6–20(–25) capitula, spreading already at beginning of anthesis; involucre 6–9 mm long; involucre bracts glabrous but to densely glandular; stellate pubescence of leaves conspicuous (sparse above, dense beneath); without stolons; cauline leaves 2–5 (coefficient of leafiness 0.09–0.10).

664. *H. permicum* Zahn in Pflzr. IV, 280 (1923) 1354; Fl. Zap. Sib. XI, 3067.—*H. macrantheloides* Zahn in Sched. HFR VII (1911) 98.—*Exs.*: GRF No. 2231.

Perennial. Stem 20–55 cm high, at base moderately setose with bristles 1.0–2.5 mm long, occasional and short (0.5 mm) bristles above, with scattered glands quickly thinning above, densely stellate-pubescent; without stolons. Basal leaves oblong-obovate to lanceolate, acute, to 10 cm long, scattered-setose above and along margin, as a whole scattered-setose, with scarcely any stellate down above, moderate (grayish) down beneath; cauline leaves 3–4(–5) (coefficient of leafiness 0.09), linear-lanceolate. Inflorescence openly paniculate, umbellate at tip, with (2–)10–20(–25) capitula; acladium to 30 mm long; peduncles glabrous or sometimes with occasional hairs, with scattered glands, gray-tomentose. Involucres 6–7 mm long; involucre bracts somewhat narrow, acute, green-bordered, glabrous, moderately, 60(48–70),

glandular, glands 0.5–1.0 mm long, conspicuously stellate-pubescent. Florets dark yellow. Flowering July. (Plate XXXIX, Fig. 1.)

Pine forests and forest grass patches.—*European Part*: Urals; *Western Siberia*: Ob Region, Upper Tobol. Endemic? Described from vicinity of Sverdlovsk. Type in Leningrad.

665. **H. conferciens** Norrl. Nya nord. Hier. I (1904) 119; Mela-Cajander, Suom. Kasvio, 674; Zahn in Pflzr. IV, 280, 1354.—**Exs.**: Norrl. Hier. exs. fasc. IV, No. 99.

Perennial. Stem 20–40 cm high, 2–3 mm in diameter, with moderate hairs below 1 mm long, thinning upward and with occasional (sometimes sparse) hairs above, moderately glandular above with large glands (thinning downward, reaching almost to base), densely stellate-pubescent; without stolons. Basal leaves oblong-ob lanceolate, dark glaucous, thick, as a whole with scattered hairs 1 mm long, sparsely stellate-pubescent above, to densely so beneath; cauline leaves 2–3(–5) (coefficient of leafiness 0.10), narrowly lanceolate, acute, glandular at tip. Inflorescence compact-umbellate, with 6–15 capitula; acladium short; peduncles glabrous, densely glandular with large glands, gray-tomentose. Involucres 8–9 mm long; involucre bracts somewhat broad, subobtusate, blackish, (almost) glabrous, densely glandular with large glands, with dense stellate down. Florets light yellow. Flowering August to September.

Rocks.—*European Part*: Karelia-Lapland (southern part). *General distribution*: Scandinavia (Finland). Endemic. Described from Onega part of Karelia. Type in Helsinki; paratype in Leningrad.

Cycle 6. **Dubia** Juxip.—*H. dubium* L. Sp. pl. ed. 2 II (1763) 1125 p. p.—*H. dubium* Fr. ex Norrl. in Mela-Cajander, Suom. Kasvio, (1906) 656.—*H. dubium* L. p. p. emend. Lindeb. Hier. Scand. (1868) No. 16 and in Hartm. Handb. Scand. Fl. ed. 11 (1879) 37; Zahn in Pflzr. IV, 280, 1360; Asch. and Graebn. Synopsis, XII, I, 258; (pro *H. cymosum-floribundum*).—*H. acrocomum* N.P. Hier. Mitteleur. I (1885) 709, 836 (pro *H. floribundum-cymosum*) Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1093.—Differ from species of cycle *Ambigua* by shorter height; glabrous leaves, mostly without stellate down above and with sparse to scattered leaf pubescence openly umbellate inflorescence with few capitula; mostly without stolons, although stolons can also be found (on digging out the plant!); involucre mostly 7–8 mm long. Often with runners and collateral stems. Distributed particularly in Sudeten and Carpathian mountains; second center of distribution lies in the north-western part of European territory of Soviet Union.

Note. Zahn (*Pflzr.* op. cit. 1363) reports *H. dubium* L. p. p. for our flora (Pushlakhta, along the White Sea Coast, Dvina-Pechora region). But, as we did not see specimens of it, and the descriptions of different authors are in conflict (apparently, varieties of this polymorphic species have been described), we are limiting ourselves here to mentioning this plant.

In the Linnaean Herbarium; *H. auricula* also is found under the name *H. dubium* L., which means that Linnaeus did not differentiate between these two species. Following Lamarck and De Candolle, who tied *H. auricula* to a definite type, Lindberg linked *H. dubium* with the plant collected at Karlskoga (Sweden) and described in *Hier. Scand.* as exs. No. 16.

666. **H. acrocomum** N.P. Hier. Mitteleur. I (1885) 710; Zahn in *Pflzr.* IV, 280, 1363; Asch. and Graebn. Synopsis, XII, I, 259.—**Exs.:** GRF Nos. 1801, 1802; GRF No. 1803, pro var. *sub-colliniforme* Zahn; Zahn, Hier. Europ. No. 138.

Perennial. Stem 20–45 cm high, 2–3 mm in diameter, somewhat ascending, with moderate dark, bristles 1.0–2.5 mm long, above with occasional glands, quickly going down to none, moderately stellate-pubescent; without stolons. Basal leaves 5(3–6), lanceolate, subobtusate to subacute, glaucescent, above with scattered or sparse bristles 3–5 mm long, without stellate down above, with rather dense stellate down beneath; cauline leaves 2(–3) (coefficient of leafiness 0.07), eglandular. Inflorescence compactly paniculate-umbellate, later becoming more open, with 6–15 capitula; acladium 5–8 mm long; peduncles sparsely dark-pubescent, sparsely glandular, gray-tomentose; floral bracts gray, light-bordered. Involucres 6–7(–8) mm long, ovate, later subglobose; involucre bracts somewhat broad, acute, or subobtusate, dark, with light border, and sparse, 15(6–23), light-colored hairs 1.5–2.0 mm long, with sparse, 15(6–26), glands 0.5–0.7 mm long, grayish from down (down sparse along margin). Florets yellow; stigmas yellow. Flowering June to July. (Plate XL, Fig. 1.)

Meadows, old fields.—*European Part:* Baltic Region, Upper Volga. *General distribution:* Central Europe. Described from Silesia. Type in Munich.

667. **H. sysolskiense** Zahn in Sched. HFR VII (1901) 86; Zahn in *Pflzr.* IV, 280, 1361.—**Exs.:** GRF No. 2202.

Perennial. Stem 10–40 cm high, 2–3 mm in diameter, moderately setose in lower part with upwardly spreading bristles 1.0–2.5 mm long, thinning upward (hairs [bristles] with black base), sparsely glandular above, rather densely stellate-pubescent above, thinning downward;

without stolons but often with runners. Basal leaves 2–3, lanceolate to narrowly lanceolate, mostly acute, to 9 cm long (7–10:1), pale yellowish-green, with sparse bristles 1.0–2.5 mm long, sparsely stellate-pubescent on both sides; cauline leaves (2–)3–5 (coefficient of leafiness 0.12), narrowly lanceolate, glandular at tips. Inflorescence umbellate-paniculate, with (3–)5–15(20) capitula; acladium 5–12 mm long; peduncles with occasional to sparse hairs 1.5 mm long and occasional glands, gray-tomentose. Involucres 6.0–7.5 mm long; involucre bracts somewhat broad, acute, scarcely bordered, with occasional, 14(10–17), hairs 2 mm long and equally occasional, 13(10–15), glands 0.5 mm long, moderately stellate-pubescent. Stigmas yellow. Flowering June to July.

Dry places.—*European Part*: Dvina-Pechora. Endemic. Described from Syktyvkar. Type in Leningrad.

Note. Zahn's mention of "pedunculi subepilosi" in the diagnosis needs to be corrected; hairs—occasional to sparse—are always present on the peduncles.

Apparently, *H. biformatum* Norrl. (*Herb. Mus. Fenn.* ed. 2, 1889, 153; *Herb. Pilos. Fenn.* II, No. 183; Mela-Cajander, *Suom. Kasvio.* 657; *Pflzr.* IV, 280, 1361), endemic to Sweden, should be included here. It was, however, reported by Zahn also for Gorky, which is extremely doubtful.

668. **H. accline** Norrl. in Mela-Cajander, *Suom. Kasvio.* (1906) 657; Zahn in *Pflzr.* IV, 280, 1360.—*Pilosella acclinis* Norrl. *Herb. Mus. Fenn.* ed. 2 (1889) 153.—**Exs.:** Norrl. *Herb. Pil. Fenn.* II (1894) No. 179; Norrl. *Hier. exs. fasc.* IV, Nos. 32, 33.

582 Perennial. Stem 20–70 cm high, 2–3 mm in diameter, slightly ascending, violet at base and moderately covered with slender bristles 2–3 mm long, quickly thinning upward, above with occasional, dark bristles 1 mm long and to scattered glands, glands quickly thinning downward to none, stellate pubescence more or less scattered; with short runners. Basal leaves 5–8, oblong-spatulate with rounded tip, to (narrowly) lanceolate (7:1) and acute, to 9 cm long, entire, glaucescent (midrib often violet beneath) with occasional hairs (1.0–1.5 mm long, above 2–3 mm) on both sides and along margin, to densely hairy beneath along midrib, as a whole with scattered pubescence, without stellate hairs down, with scattered stellate down beneath mostly only along midrib; cauline leaves 1–2(–3) (coefficient of leafiness 0.04), lanceolate, acute. Inflorescence compactly umbellate-paniculate later more open, with 5–20(–30) capitula; peduncles thin, glabrous, with scattered glands, 0.5 mm long, gray-tomentose; floral bracts with very white border. Involucres 6.5–7.5 mm long; involucre bracts somewhat broad, subobtusate, dark, with wide border, with occasional to sparse,

13(10–20), hairs 1.5–2.5 mm long and occasional to sparse, 17(10–30), glands 0.5–0.7 mm long, with slight stellate down. Florets yellow, teeth [on ligules] of peripheral florets reddish; stigmas yellow. Flowering June to July.

Dry-bottom meadows, dry barren slopes.—*European Part*: Ladoga-Ilmen, Dvina-Pechora (southern part). *General distribution*: Finland. (Described from vicinity of Sortavala [Serdobol].) Type in Helsinki; paratype in Leningrad.

Note. Apparently, the following species should be referred to this species: *H. acclinifolium* Norrl. (*Nya nord. Hier.* I, 1904, 82), found in the Ladoga-Ilmen Region; *H. erraticum* Norrl. (*Herb. Mus. Fenn.* ed. 2, 1889, 153), from Lapland; *H. gorkense* Norrl. (*Herb. Pilos. Fenn.* II, 1894, 176), from the Ladoga-Ilmen Region; *H. infidulum* Norrl. (*Pilos. Bor.* 1895, 59), from the Ladoga-Ilmen Region; and *H. pubifolium* Norrl. (*Herb. Mus. Fenn.* 1. c.), from the Ladoga-Ilmen Region, all perhaps deserving the rank of variety. All of them are mentioned in Norrl. Mela-Cajander, *Suom. Kasvio*, 1. c. and in the work of Zahn. We were unable to examine authentic specimens. Their types are in Helsinki.

669. ***H. subfloribundum*** (N.P.) Dahlst. in Acta Berg. II, 4 (1894) 35; Beitr. Hier. Fl. Oesels, 18; Zahn, Hier. fl. Mosquens. 47; Pflzr. IV, 280, 1290 (pro ssp. *H. suecicum* Fr.); Asch. and Graebn. Synopsis, XII, I, 259.—*Pilosella suecica* ζ. *asperula* Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 59.—*H. floribundum* ssp. *suecicum* β. *subfloribundum* N.P. Hier. Mitteleur. I (1885) 695 p. p.—**Exs.**: Norrl. Herb. Pilos. Fenn. I (1884) Nos. 35, 36; Hier. exs. fasc. III, Nos. 74–76; Dahlst. Hier. Scand. XVIII, No. 31, XXIII, Nos. 6, 7.

Perennial. Stem 20–50 cm high, 1.0–2.5 mm in diameter, violet at base and with scattered to moderate, light-colored hairs 1.0–1.5 mm long, quickly thinning upward, densely to sparsely glandular above, sparsely or to scatteredly stellate-pubescent; stolons absent or present, like those of *H. suecicum*, with well-developed or rudimentary leaves. Basal leaves 2–7, obovate, with rounded tip to lanceolate, to 12 cm long (7–8:1), short-acuminate, sinuate, often with plicate tip, glaucous, 583 with very sparse bristles 1–2 mm long only along margin and beneath along midrib, without stellate down above, sparsely pubescent beneath and mostly only along midrib; cauline leaves 2–3 (coefficient of leafiness 0.05), lanceolate, scarcely semiamplexicaul, acute, without stellate down above, with down to scattered beneath, glandular at tip. Inflorescence umbellate, with 3–10(–25) capitula; acladium 5–10 mm long; peduncles glabrous or with occasional hairs, moderately or to densely glandular, densely stellate-pubescent. Involucres 7–8(–10) mm long; involucre bracts somewhat narrow, acute, dark, with sparse,

20(13–26), light-colored hairs with dark base or dark hairs 1 mm long, with sparse, 17(14–24), glands 0.5–1.0 mm long, very scatteredly stellate-pubescent. Florets often on outside with red stripes; stigmas dark. In habit, resembling *H. suecicum* Fr., from which it is distinguished by the denser stellate pubescence. Flowering June to July.

Dry grassy places, sandy glades.—*European Part*: Dvina-Pechora, Baltic Region, Ladoga-Ilmen, Upper Volga. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki; cotype in Munich.

Note. Plants (identified by Zahn) that fit the description of *H. floribundiforme* N.P. were distributed under this name as GRF (No. 1276). Zahn (*Pflzr.* IV, 280, 1923, 1293) cites the same specimen, GRF (No. 1276), also for *H. nigellum* Norrl. This, possibly, means that heterogeneous material was described under this number. In *H. nigellum* the hairs and glands on the involucre bracts are found in the ratio of 2:1. In *H. subfloribundum* (N.P.) Dahlst. the hairs and glands on the involucre bracts are found in equal numbers, whereas in *H. floribundiforme* N.P. they are in the ratio of 1:4(–5). The same is also true of plants issued as GRF (No. 1251) under the name *H. acrocomum* ssp. *floribundiforme* N.P., also identified by Zahn.

670. **H. microstrum** Zahn in Sched. HFR VII (1911) 86; *Pflzr.* IV, 280, 1361.—**Exs.**: GRF No. 2201.

Perennial. Stem 25–55 cm high, with scattered, hairs 0.5–1.5 mm long, thinning upward, sparsely glandular above, scarcely so downward, moderately stellate-pubescent; stolons absent? Basal leaves 5–7, outer spatulate, obtuse, others lanceolate to narrowly lanceolate, acute, to 8 cm long (8:1), scarcely fine-toothed, sparsely setose with bristles 1–2 mm long along margin and above, denser beneath along midrib, particularly toward base, sparsely stellate-pubescent above, moderately so beneath; cauline leaves 2–5 (coefficient of leafiness 0.08), lanceolate, sometimes with glands. Inflorescence paniculate-umbellate, later more open, with 8–15(–33) capitula; acladium 2–6 mm long; peduncles glabrous or with occasional hairs, very sparsely glandular, gray-tomentose; floral bracts light-colored, along midrib with black-based hairs. Involucres 5.5–6.5 mm long; involucre bracts narrow, subacute, inner with green border, with occasional, 4(2–7), hairs 1.5 mm long, with black base and occasional or sparse, 15(12–17), glands 0.3 mm long, with sparse stellate down. Stigmas yellow. Flowering June to July.

Dry slopes.—*European Part*: Volga-Don. Endemic. Described from Bolkhov District (Orlor[Orel] Region). Type in Leningrad.

671. **H. pilipes** Sael. in Meddel. Soc. Fa. Fl. Fenn. VI (1881) 183, ex p. Norrl. Anteckn. öfv. Finl. Pilos. I, 141; Mela-Cajander, Suom. Kasvio, 656; Zahn in Pflzr. IV, 280, 1361.—**Exs.:** Herb. Pilos. Fenn. I (1884) No. 79; Norrl. Hier. exs. fasc. V, Nos. 26, 27.

Perennial. Stem 25–60 cm high, 2–3 mm in diameter, at base with sparse hairs 2–3 mm long, thinning upward, above with occasional, dark hairs 2–4 mm long and sparse glands 0.5 mm long, scatteredly stellate-pubescent; stolons slender, underground, often abortive. Basal leaves 5–7, lanceolate, contracted toward base, subobtuse to acute, grayish-green, above with occasional hairs 3 mm long, along margin hairs 1 mm long, moderately hairy beneath, densely so along midrib, hairs 1.5–2.0 mm long, as a whole scatteredly pubescent, on both sides moderately stellate-pubescent (beneath sometimes hyaline-tomentose); cauline leaves 1–2 (coefficient of leafiness 0.04), lanceolate, small. Inflorescence openly paniculate-umbellate, with 4–15 capitula; acladium 3–6 mm long; peduncles glabrous or with occasional hairs, with moderate glands 0.5 mm long, gray-tomentose. Involucres 6.5–7.5 mm long, ovate; involucre bracts somewhat broad, subobtuse, with light-colored border, with occasional (5) hairs 2 mm long and scattered (30–35) glands 0.7 mm long, scatteredly stellate-pubescent. Corollas sulfur yellow; stigmas yellow, later turning dark. Flowering June to July.

Open grassy barrens.—*European Part:* Dvina-Pechora (southern part). *General distribution:* Scandinavia (Finland). Described from Finland. Type in Helsinki.

672. **H. floribundiforme** N.P. Hier. Mitteleur. 1 (1885) 710.—*H. hirtulum* Peter in Nachr. K. Ges. Wiss. Götting. 2 (1893) 78; Zahn, Hier. fl. Mosquens. 43; Pflzr. IV, 280, 1476.—*Pilosella dubia* Fries, Hier. Europ. exs. No. 33 p. p.—**Exs.:** GRF Nos. 1251, 1276 p. p.

Perennial. Stem 20–40 cm high, 1–2 mm in diameter, violet at base, with moderate to dense hairs 1 mm long, quickly thinning upward, distinctly glandular above, scatteredly stellate-pubescent; without stolons. Basal leaves 3–4(2–7), spatulate to lanceolate, acute, to 10 cm long (5.3:1), glaucescent, with sparse hairs 0.5–1.0 mm long along margin and beneath along midrib, without stellate down above, with down to scattered beneath (more conspicuous in younger leaves); cauline leaves 2 (coefficient of leafiness 0.07), lanceolate, in lower part of stem. Inflorescence openly umbellate-paniculate, with 3–12 capitula; peduncles almost glabrous, to scatteredly glandular, gray-tomentose; acladium 9 mm long. Involucres 6–7 mm long, globose; involucre bracts narrow, subacute, dark, with narrow border, with occasional, 5(3–13), mostly dark hairs 1.0–1.5 mm long and sparse (to scattered),

24(18–35), glands 0.5–1.0 mm long, sparsely stellate-pubescent. Corollas yellow; stigmas yellow. Flowering June to July.

Meadows, forest edges, old fields.—*European Part*: Upper Volga, Ladoga-Ilmen. *General distribution*: Scandinavia. Described from Uppsala. Type in Munich.

Note. It has often been cited under the name *H. subfloribundum* (N.P.) Dahlst.

673. **H. floribundoides** Zahn, Hier. fl. Mosquens. (1911) 50; Pflzr. IV, 280, 1361.

Perennial. Stem 30–60 cm high, 2 mm in diameter, violet at base, with sparse hairs 0.5 mm long, variant with scattered hairs 2.5 mm long, above moderately glandular (glands thinning almost to base), scatteredly stellate-pubescent, often with collateral stems. Basal leaves oblong-spatulate to narrowly lanceolate, light green, with sparse hairs 0.5 mm long along margin and beneath along midrib, scarcely stellate-pubescent above, scatteredly so beneath, inner leaves often glandular; cauline leaves 2 (coefficient of leafiness 0.04), lanceolate, glandular. Inflorescence umbellate-paniculate, with up to 20 capitula; peduncles glabrous, densely glandular, gray-tomentose. Involucres small, 4.5–5.0 mm long, cylindrical; involucral bracts narrow, acute, glabrous, densely fine-glandular, moderately stellate-pubescent. Corollas light yellow. Flowering June to July.

Meadows and forest edges.—*European Part*: Upper Volga. Endemic? Described from Moscow Region. Type unknown.

Cycle 7. Polioderma Juxip.—*H. poliodermum* Dahlst. Bidr. Südöstr. Sverig. Hier.-Fl. I (1893) 119; Zahn in Pflzr. IV, 280, 1365; Asch. and Graebn. Synopsis, XII, I, 260.—*H. dubium* > *pilosella* Zahn l. c.—Stem 15–50 cm high, inflorescence openly paniculate to shallowly dichotomous, with 2–17 capitula; stellate pubescence of leaves mostly absent above, but dense beneath; [corolla] teeth of peripheral florets reddish; plant with or without stolons.

674. **H. transbalticum** Dahlst. Beitr. Hier.-Fl. Oesels (1901) 21; Zahn in Pflzr. IV, 280, 1365; Asch. and Graebn. Synopsis, XII, I, 260.

Perennial. Stem 25–50 cm high, 1.5–2.0 mm in diameter, with sparse, long, whitish bristles (their base thick and black), above with sparse glands, quickly thinning, moderately stellate-pubescent; without stolons. Basal leaves 3–8, lingulate or spatulate, rounded-obtuse to narrowly lanceolate and acute (10:1), glaucescent, above with occasional hairs 3 mm long, beneath and along margin with occasional hairs 1 mm long, as a whole sparsely pubescent, without stellate down, ash-gray

- 586 beneath from dense down; cauline leaves 1-2(-3) (coefficient of leafiness 0.05), linear-lanceolate, acute, somewhat semiamplexicaul. Inflorescence openly paniculate, with 3-17 capitula; acladium 15-20 mm long; peduncles glabrous or with occasional bristles (of same type as in stem), moderately glandular, gray-tomentose; floral bracts dark. Involucres 6-8 mm long; involucral bracts broad, subobtusate or abruptly acuminate, with green border, and occasional (to sparse), 9(1-16), thick, black hairs 1 mm long, with light-colored tip, with scattered, 35(25-50), glands 0.5 mm long, ash-gray from dense stellate down. Corollas yellow, teeth of peripheral florets sometimes reddish; stigmas yellow. Flowering June to July.

Calcareous rocks.—*European Part*: Baltic Region. Endemic. Described from Filsand Island (near Saaremaa Island of Estonian SSR). Type in Stockholm.

Note. It is very similar to *H. polioderium* Dahlst., probably representing its eastern race. It differs by the density of the pubescence on all parts.

675. **H. apatelioides** Zahn in Sched. HFR VI (1908) 76; Hier. fl. Mosquens. 48; Pflzr. IV, 280, 1365.—**Exs.**: GRF Nos. 1804, 2203.

Perennial. Stem 15-20 cm high, with scattered, somewhat dark hairs 1-3 mm long and sparse glands, scatteredly stellate-pubescent; stolons mostly thin, short, underground or above-ground, as in *H. auricula*. Basal leaves 5-10, oblong, spatulate to lanceolate, obtuse, to 6 cm long (5.3:1), glaucescent, sparsely pubescent above; densely so along margin and beneath along midrib, as a whole to sparsely pubescent, without stellate down above, down to scattered beneath; cauline leaves (0)1-2 (coefficient of leafiness 0.10), without down above, to dense down beneath. Inflorescence shallowly dichotomous, with 2-4 capitula; acladium 10-20(-60) mm long; peduncles with occasional hairs, scatteredly glandular, gray-tomentose; floral bracts whitish, often colored. Involucres 8-9 mm long; involucral bracts narrow, subobtusate, green-bordered, with sparse, 25(15-30), hairs 2 mm long and scattered, 27(15-45), glands 0.5 mm long, moderately stellate-pubescent; corolla teeth of peripheral florets often reddish. Flowering June to July.

Wet meadows, old fields.—*European Part*: Upper Volga. Endemic. Described from vicinity of Moscow. Type in Leningrad.

Note. Individual herbarium specimens differ greatly in the degree of pubescence.

Subsection 4. Sciadophora Juxip.—*H. sciadophorum* N.P. Hier. Mitteleur. I (1885) 440, 810; Zahn, Hier. fl. Mosquens. 28; Pflzr. IV, 280,

1333; Asch. and Graebn. Synopsis, XII, I, 229.—*H. cymosum* + *auricula* N.P. l. c.—*H. cymosum-auricula* (N.P.) Zahn in Pflzr. l. c.—
 587 Rhizome with rosette of leaves, rarely with short, thin, mostly underground stolons, with pale, scale-like leaves; leaves spatulate, obtuse or subobtuse, glaucous, sparsely pubescent, stellate-pubescent not only beneath (scattered to moderate) but also most of above surface (to sparse); stem and inflorescence more or less densely glandular; in habit, plants resemble *H. auricula* Lam. and DC.

The extreme rarity of the members of this subsection results from the ecological and geographic differences of the supposed progenitors, viz, *H. auricula* and *Cymosina*. The indigenous species conform to the formula *Cymigera-Auriculina*, but in the western regions one may also find species conforming to *Cymosa-Auriculina* (more densely pubescent with longer hairs).

The reports of the occurrence of *H. sciadophorum* N.P. coll. in Perm (Fedtschenko and Flerow, *Fl. Evrop. Ross.*, 1082) are extremely doubtful; it is either *H. umbelliferum* N.P. or some form of *H. zizianum* Tausch.

Typical *H. sciadophorum* N.P. was described from Piedmont; it is not found in the Soviet Union.

1. Hairs and glands on involucre bracts in ratio of 10:90.....2.
- + Hairs and glands on involucre bracts in ratio of 40:60; involucre 5.5 mm long; peduncles with occasional hairs.....
677. **H. violaceipes** Zahn f. **subignotum** Zahn
2. Involucre 7–8 mm long; leaves scatteredly pubescent.....
676. **H. leptophyes** Peter
- + Involucre 6.0–7.5 mm long; leaves sparsely pubescent; peduncles glabrous.....677. **H. violaceipes** Zahn

676. **H. leptophyes** Peter in Nachr. K. Ges. Wiss. Götting. 2 (1893) 76; Zahn, Hier. fl. Mosquens. 28; Pflzr. IV, 280, 1335.—*H. cymigerum* + *auricula* Peter l. c.—**lc.**: Syreistsch. Fl. Mosk. Gub. III (1910) 355, sub *H. sciadophorum* N.P.

Perennial. Stem 35–40 cm high, 1.5–2.0 mm in diameter, at base with moderate short hairs 0.5 mm long, thinning upward, rather densely glandular above, thinning and reaching down to middle of stem, at base almost without stellate down, with scattered down above; without stolons. Basal leaves spatulate, with rounded tip or spatulate-lanceolate, long-attenuate to base, subacute, glaucescent, with scattered hairs 0.5–1.0 mm long only along margin and beneath along midrib, often with stellate down above, such hairs scattered to moderate beneath; cauline leaves 1–3 (coefficient of leafiness 0.05), with

occasional glands at tip. Inflorescence compact-umbellate (or somewhat paniculate), with 3–5(–12) capitula; acladium 5–10 mm long; peduncles with occasional hairs 0.5 mm long, densely glandular, gray-tomentose. Involucres 7–8 mm long; involucre bracts narrow, obtuse, somewhat dark, with bright, light-colored border, and scarcely sparse hairs 0.5 mm long, to densely glandular, scatteredly stellate-hairy. Flowering June.

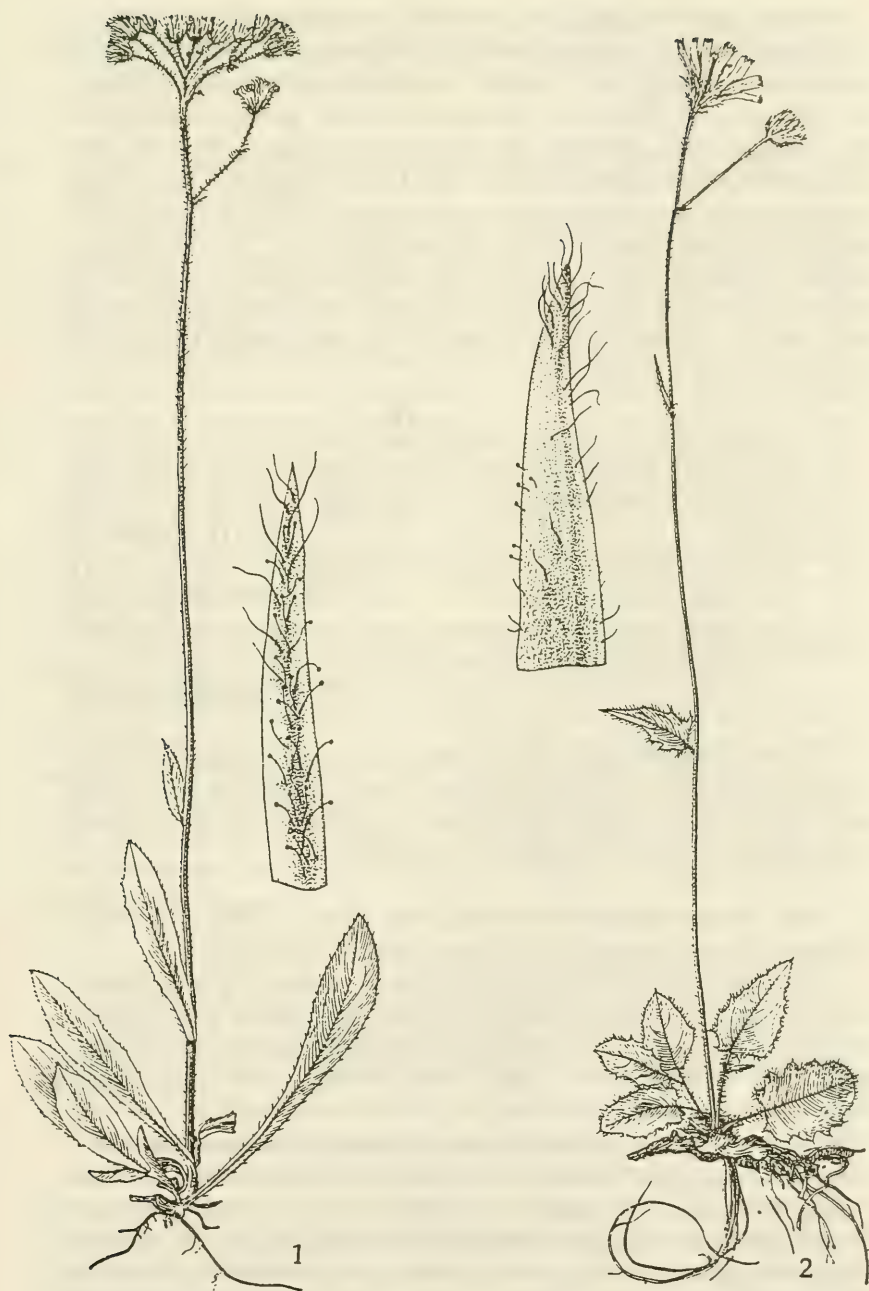
Old fields, grassy patches.—*European Part*: Upper Volga. Endemic? Described from Moscow Region. Type unknown.

677. **H. violaceipes** Zahn in Sched. HFR VI (1908) 89; Hier. fl. Mosquens. 29; Pflzr. IV, 280, 1359.—*Exs.*: GRF Nos. 1836, 1837.

Perennial. Stem 30–55 cm high, reddish-violet at base and often also entire length, with scattered hairs 0.5–1.0 mm long, thinning upward, scatteredly glandular above or with occasional glands (f. *subignotum* Zahn), scatteredly stellate-pubescent, often with runners; stolons short, underground or above-ground, as in *H. suecicum* Fr., or entirely absent (f. *subignotum* Zahn). Basal leaves 8(5–10), oblong-spatulate to lanceolate, obtuse to subacute, to 9 cm long (6:1), glaucous or yellowish-green (f. *subignotum* Zahn), mostly glabrous on both sides, moderately pubescent beneath along midrib, as a whole with sparse hairs 0.5–1.0 mm long, very sparsely stellate-pubescent above (mostly only along midrib and margin), scatteredly so beneath (particularly along midrib); cauline leaves 2(–4) (coefficient of leafiness 0.07), lanceolate, conspicuously stellate-pubescent beneath, upper leaves with occasional glands at tip. Inflorescence umbellate, with 5–20 capitula; acladium 7 mm long; peduncles almost glabrous or with occasional, distinctly dark hairs to 1.5 mm long (f. *subignotum* Zahn), with moderate glands 0.5–1.0 mm long or with sparse glands 0.4–0.5 mm long (f. *subignotum* Zahn), gray-tomentose; floral bracts light-colored, with dark midrib. Involucres 6.0–7.5 mm or 5.5 mm long (f. *subignotum* Zahn), ovate-cylindrical; involucre bracts narrow, subobtuse, dark, scarcely bordered, with occasional, 3(0–7), dark hairs 1.0–1.5 mm long or more conspicuous, 9(6–10), hairs 1.5 mm long (f. *subignotum* Zahn) and sparse to scattered, 23(16–30), glands 0.5–1.0 mm long, or to scarcely sparse, 13(10–16), thin glands 0.4–0.5 mm long (f. *subignotum* Zahn), scatteredly stellate-pubescent. Corollas light yellow; stigmas yellowish-brown. Flowering June to July.

Dry and flood-plain meadows, old fields.—*European Part*: Upper Volga. Endemic. Described from Kalinin Region. Type in Leningrad.

Note. The form f. *subignotum* Zahn (GRF No. 1837) perhaps deserves to be raised to the rank of species because of the significant differences.



Subsection 5. **Laschia** Juxip.—*Pilosella laschii* Sz. Sz. in Flora XXI (1862) 432.—*H. canum* N.P. Hier. Mitteleur. I (1885) 428.—*H. cymosum* + *pilosella* N.P. l. c.—*H. cymosopilosella* Wimm. Fl. Schles. 3 (1857) 319.—*H. pilosella* × *cymosum* Aschers. Fl. Brand. (1864) 393.—*H. cymosum* < *pilosella* Rouy, Fl. Fr. (1905) 255, Zahn in Pflzr. IV, 280, 1328; Asch. and Graebn. Synopsis, XII, I, 222.—Stem 10–50 cm high, shallowly or deeply dichotomous; inflorescence with 2–6, more or less large (9–11 mm long) capitula; cauline leaves 0–2, leaves sparsely stellate-pubescent above, densely (hyaline-tomentosely) beneath; in habit, stolons as in *H. pilosella* or absent (?). Very rare plants, highly polymorphic. Hybrids or hybridogenous species between *Cymosa* (or *Cymigera*) and *Pilosellina*.

1. Involucral bracts densely to moderately hairy.....2.
- + Involucral bracts glabrous or with sparse hairs, moderately glandular; involucre 9.0–9.5 mm long; stolons well-developed.....680. **H. canum** N.P.
2. Involucral bracts to densely hairy, eglandular; involucre 10–11 mm long; without stolons.....678. **H. curvicollum** Norrl.
- + Involucral bracts to moderately hairy, with occasional glands; involucre 10 mm long; stolons well developed.....679. **H. scopulorum** Juxip

Cycle 1. Curvicolla Juxip.—Involucral bracts conspicuously pubescent, eglandular or with occasional glands; involucre 10–11 mm long; pubescence of stem and leaves long (hairs 2–4 mm). Forms intermediate between *Cymosa* and *Pilosellina*.

678. **H. curvicollum** Norrl. Nya nord. Hier. I (1904) 120; Mela-Cajander, Suom. Kasvio, 675; Zahn in Pflzr. IV, 280, 1356.

Perennial. Stem 20–30 cm high, 2 mm in diameter, at base moderately setose with thin bristles 2.5–4.0 mm long, above bristles fewer and shorter (2.0–2.5 mm), with dense small glands and densely stellate-pubescent; without stolons. Basal leaves oblong, acute, entire, glaucous, sparsely pubescent above, as a whole scatteredly so, on both sides conspicuously stellate-pubescent (beneath hyaline-tomentose); cauline leaves 1 (coefficient of leafiness 0.04). Inflorescence dichotomous, with few (2–4) capitula; acladium to half as long as stem or longer; peduncles moderately setose with bristles 2.0–2.5 mm long and moderately glandular with small glands, gray-tomentose. Involucre 10–11 mm long; involucral bracts narrow, acute, with reddish tips, with dense, short, gray hairs, eglandular, densely stellate-pubescent. Corolla light yellow, teeth of peripheral florets red. Flowering July?

Edges of pine forests.—*European Part*: Ladoga-Ilmen (northern part). Endemic. Described from Karelian Isthmus. Type in Helsinki.

Note. The above description is based on Norrlin's incomplete diagnosis.

- 592 679. **H. scopulorum** Juxip in Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR, XIX (1959) 530.

Perennial. Stem 50 cm high, 2 mm in diameter, with scattered hairs 4 mm long, scatteredly glandular above, conspicuously stellate-pubescent; stolons to 20 cm long, with 8 small leaves. Basal leaves 10, lanceolate, acute, (8.5:1), glaucous, with scattered hairs 3.5–2.0 mm long; with stellate down, sparse above, dense beneath (hyaline-tomentose); cauline leaves 1–2 (coefficient of leafiness 0.03), lanceolate, acute (10:1), pubescence as on basal leaves, stellate-pubescence rather dense above and very dense beneath. Inflorescence deeply dichotomous, with 2 capitula; acladium $1/2$ – $3/4$ as long as stem. Involucres 10 mm long; involucre bracts somewhat broad, acute, with moderate (60) hairs 3 mm long and with occasional (5) glands 0.3 mm long, densely stellate-pubescent; corollas on outside with red stripes. Flowering June to July.

Calcareous rocks.—*European Part*: Baltic Region (Estonian SSR). Endemic. Described from Saaremaa Island. Type in Stockholm.

Note. Dahlstedt called this plant *H. pilosella* ssp. *magnipes* Dahlst. (*Bidr. Hier.-Fl. Oesels*, 1901, 13), and this name was used in Zahn's monograph (*Pflzr.* IV, 280, 1161; Asch. and Graebn. *Synopsis*, XII, I, 35). The species was placed in the group *Oligadenia* Brenn. However, this plant should be included in subsection *Laschia* because of the well-developed cauline leaf and distinct stellate pubescence on both sides of the leaves.

Cycle 2. Cana Juxip.—Involucre bracts mostly glabrous, rarely with occasional, short hairs, with appreciable to moderate glands; involucres 9.0–9.5 mm long; pubescence of stem and leaves short, hairs 1.0–1.5 mm long. Forms intermediate between *Cymigera* and *Pilosellina*.

680. **H. canum** N.P. Hier. Mitteleur. I (1885) 431; Zahn in Fedtsch. and Flerow, *Fl. Evrop. Ross.* 1081; Zahn, *Hier. fl. Mosquens.* 27.—*H. laschii* Zahn in *Pflzr.* IV, 280 (1923) 1331; Asch. and Graebn. *Synopsis*, XII, I, 227, sub *H. eu-laschii* (*H. vaillantii* < *pilosella*).—**lc.**: Syreistsch. *Fl. Mosk. Gub.* III (1910) 354.—**Exs.**: Hier. Naeg. Nos. 30, 94, 158; Zahn, *Hier. Europ.* No. 832.

Perennial. Stem 20–40 cm high, 1.5–2.0 mm in diameter, with very sparse, light-colored hairs 1 mm long, with scattered glands above

thinning downward, grayish from stellate down; stolons long, thinish, as in *H. pilosella*. Basal leaves 6–8, narrowly lanceolate, acute, yellowish-green, with sparse to scattered hairs 1.0–1.5 mm long, moderately stellate-pubescent above, densely so beneath (hyaline-tomentose); cauline leaves 1 (coefficient of leafiness 0.03), in lower fourth of stem, with very occasional glands. Inflorescence deeply or shallowly dichotomous, with 2–6 capitula; acladium 1/5–1/2 as long as stem; peduncles glabrous or with sparse hairs 1 mm long, moderately glandular, 593 gray-tomentose; floral bracts gray. Involucres (7–)9.0–9.5 mm long, cylindrical-ovate; involucral bracts narrow, acute, dark, with light-colored border, glabrous (f. *epilosum* N.P.) or with sparse hairs 0.5–1.0 mm long (f. *subpilosum* N.P.), moderately (conspicuously), 44(40–50), glandular, glands 0.4 mm long, gray from stellate down. Corollas yellow; peripheral florets on outside sometimes slightly reddish. Flowering June to July.

Meadows and scrubs on sandy soil, mostly together with its progenitors. Rare. Highly polymorphic.—*European Part*: Upper Volga. *General distribution*: Central Europe. Described from Austria. Type in Munich.

Section 19. Pratensina Asch. and Graebn. Fl. N.O. Deutsch. Flachl. (1898) 776; Zahn in Koch, Synopsis, 3, II, 1713; Pflzr. IV, 280, 1239; Asch. and Graebn. Synopsis, XII, I, 6, 132.—*Collinina* N.P. Hier. Mitteleur. I (1885) 58.—Characters in key to sections (p. 9). Stem rather tall, fistular (more or less easily flattened); stolons of three types: 1) above-ground, with leaves gradually becoming larger toward tip of stolons or with largest leaves in middle; 2) with rosette at tip of creeping stolons; and 3) underground, with pale scales instead of leaves, very easily breaking off; stem and leaves variously (densely to very sparsely) covered with stiff hairs; stellate down on leaves absent or very scattered beneath, but in forms transitional to *Pilosellina* it may be up to hyaline-tomentose; cauline leaves (0)1–5; inflorescence mostly paniculate with umbellate top, more or less dense, later open, with rather large number of capitula or shallowly to deeply dichotomous, with few capitula (in forms derived from *Pilosellina*); corollas yellow or red; stigmas yellow or dark. Mesophytes. Growing mainly in Eastern Europe, less frequently in Siberia, Caucasus, and Soviet Central Asia.

KEY TO SUBSECTIONS OF SECTION *PRATENSINA*

1. Inflorescence paniculate-umbellate, more or less compact, only later more open, with short (measuring 1.5% of stem length) acladium; mostly with many, 15(5–40), capitula.....2.

- + Inflorescence shallowly or deeply dichotomous (or very openly paniculate from beginning of anthesis), with longer (to long) acladium and with not many capitula; leaves often stellate-pubescent beneath (pubescence weak to dense).....Subsection 2. **Flagellares** Juxip
- 2. All florets yellow, concolored, or peripheral ones on outside more or less weakly purple-striped or only their teeth reddish; plants of plains.....Subsection 1. **Pratenses** Juxip
- + All florets red or inner ones bright orange, and peripheral ones more or less purple; plants of mountains of subarctic zone of the North (in plains exclusively introduced).....Subsection 3. **Aurantiaca** Juxip

594 Subsection 1. **Pratenses** Juxip.—*H. pratense* Tausch ex Zahn in Pflzr. IV, 280, 1268; Asch. and Graebn. Synopsis XII, I, 164.—Characters in key to subsection of section *Pratensina*.

Members of subsection *Pratenses* differ from those of *Aurantiaca* virtually only by the color (yellow) of the corolla and grow mostly in plains. Moreover, in forms derived from *Pilosellina*, the peripheral florets mostly have red stripes on the outside, or the teeth of the florets are reddish.

Apparently, the red-flowered *Aurantiaca*, species inhabiting the mountains and subarctic zone of Europe, originated from *Pratenses* species.

The leaves of autumn plants are less pubescent and have more glaucescence.

- 1. Pubescence on leaves (very) dense to scattered; leaves light green.....2.
- + Pubescence on leaves sparse; leaves blue-green (glaucous).....11.
- 2. Hairs on leaves 1.5–3.0 mm long.....3.
- + Hairs on leaves short, 0.3–1.0 mm long.....9.
- 3. Plant of European territory of Soviet Union and Siberia.....4.
- + Plant of Caucasus.....690. **H. longiscapum** Boiss. and Kotschy
- 4. Inflorescence compact-paniculate, later more open.....5.
- + Inflorescence openly paniculate at anthesis.....686. **H. dissolutum** N.P.
- 5. Involucral bracts without border or barely (green-) bordered....6.
- + Involucral bracts very broadly light-bordered.....685. **H. colliniforme** N.P.
- 6. Peripheral florets on outside with weak reddish stripes.....681. **H. sudetorum** N.P.

- + All florets concolored, yellow.....7.
- 7. Hairs and glands on involucre bracts more or less equal in number.....8.
- + Hairs and glands on involucre bracts equaling, for example, ratio of 4/5–1/5 [4:1]; involucre bracts very narrow and acute684. **H. altaicum** N.P.
- 8. Leaves without stellate down above, down mostly scattered beneath (sometimes only along midrib).....682. **H. pratense** Tausch
- + Leaves sparsely stellate-pubescent above, to moderately so beneath; involucre bracts very narrow and acute.....683. **H. leptocaulon** N.P.
- 9 (2). Involucres (6–)7–8 mm long; leaves glaucescent-light green, on both sides moderately pubescent with hairs 1 mm long; involucre bracts somewhat wide; floral bracts whitish; stigmas dark ochereous.....687. **H. karelicum** Norrl.
- 595 + Involucres (5–)6.0–7.5 mm long; leaves purely light green, on both sides densely pubescent with hairs 0.3–1.0 mm long; involucre bracts narrow; floral bracts dark with whitish border.....10.
- 10. Stem and leaves very densely pubescent; leaves without stellate down above, with occasional stellate hairs beneath (along midrib); stigmas dark; plants of the European territory of Soviet Union and Siberia.....688. **H. onegense** Norrl.
- + Stem and leaves to densely pubescent; leaves to very scarcely stellate-pubescent above, scatteredly so beneath; stigmas yellow, later brown; plants of Siberia and Soviet Central Asia.....669. **H. dublitzkii** B. Fedtsch. and Nevski
- 11 (1). Stellate hairs on all parts, except peduncles, very sparse (*Cycle Floribunda*).....12.
- + Stellate hairs on all parts more or less conspicuous; in habit, plants resembling *Floribunda* (*Cycle Scandinavica*).....16.
- 12. Involucre bracts with noticeable (scattered), white, silky hairs 2.0–2.5 mm long but with occasional glands (ratio of hairs to glands 3:1).....693. **H. sudavicum** N.P.
- + Involucre bracts with sparse or occasional hairs.....13.
- 13. Involucre bracts with occasional hairs but to scattered glands (ratio of hairs to glands 1:4).....691. **H. baenitzii** N.P.
- + Hairs and glands on involucre bracts more or less equal in number (both sparse to scattered).....14.
- 14. Peduncles glabrous or with occasional hairs.....15.
- + Peduncles scatteredly (noticeably) pubescent.....694. **H. regiomontanum** N.P.

15. Plant with long, thin, ascending runners resembling collateral stems; leaves on both sides with occasional hairs near margin.....692. **H. floribundum** N.P.
 + Plant with creeping leafy stolons, sometimes not forming runners; leaves on both sides glabrous, hairs only along margin and beneath along midrib.....695. **H. suecicum** (Fr.) N.P.
- 16 (11). Involucres 5–6 mm long.....17.
 + Involucres 8 mm long.....18.
17. Hairs and glands on involucre bracts more or less equal in number.....697. **H. glomeratiforme** Zahn
 + Involucre bracts with occasional hairs but scatteredly glandular (ratio of hairs to glands (1:2)); florets tubular.....698. **H. muratoveönse** Zahn
18. Involucre bracts with occasional hairs, to moderately glandular (ratio of hairs to glands 15:85); florets ligulate, sulfur yellow.....696. **H. renidescens** Norrl.
- 596 + Hairs and glands on involucre bracts equal in number (both to moderate).....699. **H. curvulatum** Zahn

Cycle 1. Praticola Juxip.—*Grex H. pratense* Zahn in Pflzr. IV, 280, 1269.—*H. eu-pratense* Zahn in Asch. and Graebn. Synopsis, XII, I (1929) 165.—Inflorescence paniculate-umbellate, more or less compacted, later more open, with more or less short acladium (on average 1.5% of stem length), mostly with many, 15(5–40), capitula; leaves densely to scatteredly pubescent with hairs 1–3 mm long, light green, involucre more or less thickish-cylindrical; stolons somewhat thin and mostly above-ground, with more or less large leaves, in habit and size resembling basal leaves; growing in European territory of Soviet Union and Siberia.

681. **H. sudetorum** N.P. Hier. Mitteleur. I (1885) 306; Zahn in Pflzr. IV, 280, 1269; Asch. and Graebn. Synopsis, XII, I, 165.—**Exs.:** Callier, Fl. Siles, No. 1107; Baenitz, Herb. Europ. No. 7907; Dörfler, Herb. norm. No. 3164.

Perennial. Stem 20–60 cm high, 1.5–3.0 mm in diameter, rather dense bristles 3–4 mm long, in lower part light-colored, downward-directed, in upper part dark, horizontally spreading, scatteredly glandular above and thinning upward; moderately stellate-pubescent; stolons long, thin. Basal leaves lanceolate to oblong, obtuse to acute, light green, on both sides with scattered hairs 2–3 mm long, without stellate down above, scattered down beneath; cauline leaves 2–3(–5) (coefficient of leafiness 0.07), lanceolate, pubescence as in basal leaves, sometimes with occasional glands. Inflorescence compact-paniculate,

with 6–30 capitula; acladium 2–4 mm long; peduncles with scattered hairs 3–4 mm long to densely glandular, white- or gray-tomentose; floral bracts dark. Involucre 7–8 mm long, cylindrical; involucre bracts narrow, acute, black, scarcely bordered, with sparse hairs 2.0–2.5 mm long and sparse glands, with sparse stellate down. Florets dark yellow, corollas of peripheral florets on outside with weak reddish stripes; stigmas dark. Flowering June to July.

Mountain meadows and forest edges, to 1,400 m.—*European Part*: Upper Dniester. *General distribution*: Central Europe. Described from Sudeten. Type in Munich.

Note. According to Zahn (l. c.), it conforms to the formula *H. pratense* > *aurantiacum*.

682. **H. pratense** Tausch in Flora, XI (1828) Erg.-Bl. I, 56, p. p.; Zahn, Hier. d. Schweiz, 103; Pflzr. IV, 280, 1269; Asch. and Graebn. Synopsis, XII, I, 166 (sub *H. eu-pratense* 4 *typicum* Zahn).—*H. collinum* N.P. Hier. Mitteleur, I (1885) 303.—**Exs.**: Hier. Naeg. Nos. 190, 269, 291; Callier, Fl. Siles. exs. Nos. 58, 1106, 1109, 1111, 1235–1237; Baenitz, Herb. Europ. Nos. 219, 1786; Zahn, Hier. Europ. Nos. 315, 723.

- 597 Perennial. Stem 50(25–100) cm high, 1–4 mm in diameter, hollow, easily flattened, often with collateral stems, at base densely hairy with light-colored, downward-directed hairs 1.5–3.0 mm long, sparser in middle of stem but above again with dense, horizontally spreading, darker bristles, scatteredly glandular above (glands gradually thinning down to middle of stem), densely stellate-pubescent above, thinning downward; stolons of two types: underground—thin, to 20 cm long, pale, with scale-like, rudimentary leaves, and above-ground—short, rooting, with leaves of equal size crowded into rosette, very similar to basal leaves. Basal leaves 5(2–12), elliptical to oblong-lanceolate, sub-acute, entire (or with very fine spiniform teeth), to 26 cm, long (7–9:1), light and grass-green (only autumn leaves dark green), scatteredly pubescent above and along margin, moderately so beneath, densely along midrib, as a whole moderately pubescent with hairs 1.5–3.0 mm long, without (or almost without) stellate down above, to scatteredly beneath; cauline leaves 3(2–5) (coefficient of leafiness 0.06), lanceolate, acute, pubescence as on basal leaves or somewhat denser, with occasional stellate pubescence above (along midrib and margin), scatteredly stellate-pubescent beneath (particularly along midrib), and sometimes with occasional glands. Inflorescence compactly paniculate-umbellate, more open only later, with 12(5–40) capitula; acladium 2–8 mm long; peduncles with occasional hairs, scatteredly glandular, gray-tomentose; floral bracts dark. Involucre 6.0–7.5 mm long, cylindrical; involucre bracts narrow, acute, dark, scarcely bordered, with sparse to scattered,

20(13–35), hairs 1.5–3.0 mm long and similarly glandular with 20(10–35), glands 0.3–0.4(0.5) mm long, sparsely stellate-pubescent. Florets dark yellow; stigmas dark. Flowering June to July. (Plate XXX, Fig. 2.)

Scrub meadows, open forest glades, forest edges, flood-plain meadows.—*European Part*: Karelia-Lapland (southern part), Baltic Region, Ladoga-Ilmen, Upper Volga, Upper Dnieper, Middle Dnieper, Upper Dniester, Volga-Don, Volga-Kama(?); *Western Siberia*: (sporadic?). *General distribution*: Scandinavia (southern part), Central Europe (mainly eastern part). Introduced in many places in Western Europe and North America. Described from Central Europe. Type unknown.

Note. A highly polymorphic species with many forms differing in the nature of the pubescence. It tolerates soil acidity down to pH 5.2–5.8 (according to A. Milyan's experiments, 1932) but thrives better on neutral soils. It is distinguished by its great plasticity and hence is constantly able to occupy new habitats, exhibiting a distinct tendency to spread to the west. It grows well in cultivation and becomes an invasive threat to neighboring plants.

It is absent in the southern and southeastern part of the Soviet Union, as also in Crimea and the Caucasus. Reports in the literature from these areas (Boissier, Busch, Zelenetsky, Lipsky) apparently refer to *H. longiscapum* Boiss. and Kotschy.

683. **H. leptocaulon** N.P. Hier. Mitteleur. I (1885) 306; Zahn in Pflzr. IV, 280, 1270; Asch. and Graebn. Synopsis, XII, I, 168.—*H. fimbriatum* Mert. and Roth ex Fr. Epicr. (1862) 34.—**Exs.**: Baenitz, Herb. Europ. No. 4311.

Perennial. Stem 20–60 cm high, 1.0–3.0 mm in diameter, densely to moderately pubescent with light-colored hairs 2–3 mm long, downward-directed in lower part, above with horizontally spreading bristles 1.5–2.5 mm long (f. *pilosius* N.P.) or in upper part with sparse bristles (f. *calvicus* N.P.), scatteredly glandular above, quickly thinning downward, moderately stellate-pubescent; stolons underground and above-ground, long, thin. Basal leaves 6–7, lanceolate, obtuse to acute, to 17 cm long (9:1), light green, on both sides with moderate hairs 2–3 mm long, sparsely stellate-pubescent above, moderately so beneath; cauline leaves 1–3 (coefficient of leafiness 0.05), lanceolate, acute, pubescence as on basal leaves, eglandular. Inflorescence compactly paniculate-umbellate, with 5–18 capitula; acladium 2–5 mm long; peduncles scatteredly pubescent, rather densely glandular, white-tomentose; floral bracts dark. Involucres 6.0–6.5(8.0) mm long, cylindrical; involucre bracts very narrow, acute, black, scarcely bordered, with sparse (12–23) hairs 1–2 mm long and sparse (15–30) glands 0.3–0.5 mm long,

moderately stellate-pubescent. Corollas dark yellow; stigmas dark. Flowering June to July.

Meadows.—*European Part*: Baltic Region (southern part). *General distribution*: Central Europe. Described from Tatra [Mountains]. Type in Munich.

Note. According to Zahn (*Synopsis*, l. c.), it conforms to the formula *H. pratense-cymosum*.

684. **H. altaicum** N.P. Hier. Mitteleur. I (1885) 306; Zahn, Hier. fl. Mosquens. 16; Pflzr. IV, 280, 1270.

Perennial. Stem 35–65 cm high, 1.5–3.0 mm in diameter, with rather dense, light-colored hairs 1.5–3.5 mm long, dark above, with occasional, quickly thinning glands above, moderately stellate-pubescent. Basal leaves (6) lanceolate, obtuse or subobtuse, light green, on both sides with moderate, soft bristles 1–2 mm long, without stellate down above, to scatteredly pubescent beneath; cauline leaves 2 (coefficient of leafiness 0.06), lanceolate, acute, eglandular. Inflorescence compactly-paniculate, with 5–16 capitula; acladium 2–4 mm long; peduncles with scattered bristles 1–2 mm long, scatteredly glandular, gray-tomentose; floral bracts dark, with very narrow border. Involucres 7.0–8.5 mm long, cylindrical; involucre bracts very narrow, acute, black, very
599 narrowly light-bordered, with scattered, 28(22–40), dark hairs 1–3 mm long, occasional, 9(6–12), glands 0.4–0.5 mm long, scatteredly stellate-pubescent. Corollas dark yellow; stigmas dark. Flowering June to July.

Forest and shady meadows ascending to forest belt.—*European Part*: Baltic Region, Upper Volga (Moscow Region); *Western Siberia*: Altai. Endemic. Described from Altai. Type in Munich.

685. **H. colliniforme** N.P. Hier. Mitteleur. I (1885) 308; Zahn, Hier. fl. Mosquens. 17; Pflzr. IV, 280, 1270; Asch. and Graebn. *Synopsis*, XII, I, 168.—**Exs.**: Fr. Hier. Europ. suppl. No. 18b; Hier. Naeg. Nos. 85, 151, 217; Callier, Fl. Siles exs. No. 1110; Baenitz, Herb. Europ. Nos. 73–68[sic.]; Zahn, Hier. Europ. No. 813a; GRF Nos. 1830, 1831.

Perennial. Stem 30–60(–100) cm high, 2–4 mm in diameter, very densely covered in lower part with downward-directed, light-colored bristles 2–5 mm long, to densely setose above with horizontally spreading dark bristles, scatteredly glandular above, glands quickly thinning downward, scatteredly stellate-pubescent; stolons elongate, more or less thickish. Basal leaves 6(2–10), outer obovate, others oblong to oblong-lanceolate, subacute, slightly fine-toothed, light green, to 22 cm long (8–12:1), sparsely hairy above and along margin, scatteredly so beneath, densely beneath along midrib, as a whole moderately hairy with hairs, 1–2 mm long, without stellate down above, such down

sparse beneath, mostly only along midrib; cauline leaves 2–3 (coefficient of leafiness 0.06), lanceolate, acute, eglandular or with occasional glands. Inflorescence compactly paniculate-umbellate, or later very open (var. *β. lophobium* N.P.), with 15–30(–50) capitula; acladium 9–14 mm long; peduncles with very sparse hairs, scatteredly glandular, gray-tomentose; floral bracts gray, with light-colored border. Involucres 6–7 mm long or 7–8 mm (var. *β. lophobium* N.P.), cylindrical; involucre bracts somewhat broad, subobtusate, dark, with wide, light-colored border and sparse, 20(15–25), dark hairs to 2.5 mm long, with sparse, 15(10–25), glands 0.5 mm long, moderately to scatteredly stellate-pubescent. Corollas dark yellow; stigmas dark. A highly polymorphic species, apparently growing in all regions where *H. pratense* Tausch is found, but only less frequently. Flowering June to July.

Meadows and forest edges.—*European Part*: Baltic Region (southern part), Upper volga, Upper Dnieper, Middle Dnieper, Upper Dniester. *General distribution*: Scandinavia (southern part), Central Europe, Atlantic Europe (England, possibly introduced). Introduced in North America. Described from Central Europe from a cultivated specimen. Type in Munich.

Note. Probably, *H. rawaruskanum* Zahn (*Pflzr.* op. cit. p. 1271), distinguished by sparse hairs in the inflorescence and glaucescent leaves, and also *H. dimorphum* Norrl. (*Pflzr.* l. c.), a plant common in Finland and found more or less in the bordering regions of Karelia, which differs in minor details (more or less globose involucre, more
600 acute involucre bracts, and very sparse stellate pubescence on them), should be included in this species.

686. ***H. dissolutum*** N.P. Hier. Mitteleur. I (1885) 307; Zahn, Hier. fl. Mosquens. 17; *Pflzr.* V, 280, 1272; Asch. and Graebn. Synopsis, XII, I, 169.—**Exs.**: Callier, Fl. Siles exs. No. 1108.

Perennial. Stem 40–55 cm high, 2–3 mm in diameter, at base rather densely pubescent with downward-directed, light-colored hairs, above moderately with horizontally spreading, dark hairs 2–4 mm long, above with scattered, quickly thinning glands, scatteredly stellate-pubescent; stolons short, thin. Basal leaves (4) more or less broadly lanceolate, acute, narrowed toward base, to 17 cm long (6:1), light green, on both sides with rather dense bristles 3 mm long, stellate hairs scattered, only beneath (above sometimes very sparse along midrib,); cauline leaves 2(–3) (coefficient of leafiness 0.04), lanceolate, acute, eglandular. Inflorescence openly paniculate at anthesis (branches of inflorescence much surpassing terminal capitulum), with 15–30 capitula; acladium 4–6 mm long; peduncles with occasional hairs, moderately glandular, gray-tomentose. Involucres 7.0–7.5 mm long, cylindrical, with truncate

base; involucre bracts narrow, acute, blackish, with narrow, light border, with sparse, 17(14–22), dark hairs 1.0–1.5(–3.0) mm long and sparse, 22(21–23), small glands 0.5 mm long, with very sparse stellate down. Corollas dark yellow; stigmas dark. Flowering June to July.

Meadows and forest edges.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Volga. *General distribution*: Central Europe. Described from former Eastern Prussia. Type in Munich.

Cycle 2. Silvicola Juxip.—*Grex H. silvicola* Zahn in Pflzr. IV, 280 (1923) 1272; Asch. and Graebn. Synopsis, XII, I, 170.—*H. pratense* var. *silvicola* Fr. Symb. (1848) 20.—*H. pratense* α. *silvicola* Fr. Epicr. (1862) 23.—*H. polonicum* Blocki in Öster. Bot. Zeitschr. (1887) 303.—*H. onegense* Norrl. in Medd. Soc. Fa. Fl. Fenn. II (1878) 147; Nym. Consp. suppl. II, 199.—Inflorescence paniculate-umbellate, more or less compact, later more open, with short acladium, mostly with 5–35 capitula; leaves very densely to moderately pubescent, with short hairs, 0.3–1.0 mm long (sometimes to 2 mm only beneath along midrib); involucre slender-cylindrical, stolons thin, mostly underground, with scale-like rudimentary leaves; base of stem purple-violet; plants of European territory of Soviet Union and Siberia.

687. *H. karelicum* Norrl. Anteckn. öfv. Finl. Pilos. (1884) 138; Mela-Cajander, Suom. Kasvio, 648; N.P. Hier. Mitteleur. I, 311; Zahn in Pflzr. IV, 280, 1272.—*Exs.*: Norrl. Herb. Pilos. Fenn. I, No. 76.

Perennial. Stem 25–70 cm high, 1.5–3.0 mm in diameter, with rather dense, light-colored hairs 1.0–3.0 mm long (particularly dense at base), scatteredly glandular above, glands quickly thinning downward, scatteredly stellate-pubescent; stolons short, thin, subaerial. Basal leaves oblong-lanceolate to lanceolate, acute, often with plicate tip, glaucescent-light green, to moderately pubescent on both sides with hairs 1 mm long, without stellate down above, but scatteredly stellate-pubescent beneath; cauline leaves 2–3 (coefficient of leafiness 0.06), lanceolate, eglandular. Inflorescence more or less openly paniculate-umbellate, with 6–16(–33) capitula; acladium 6–10 mm long; peduncles sparsely pubescent, moderately glandular, gray-tomentose; floral bracts whitish. Involucre (6–)7–8 mm long, cylindrical; involucre bracts somewhat broad, acute, black, with narrow green border, with scattered, 20(10–30), dark hairs 1.5–2.0 mm long and similarly scattered 19(14–28), glands, scatteredly stellate-pubescent. Corollas yellow; stigmas dark fulvous. Flowering June to July.

Meadows.—*European Part*: Baltic Region, Ladoga-Ilmen (northern part). Endemic. Described from shores of Lake Ladoga. Type in Helsinki.

Note. A species intermediate between *H. onegense* Norrl. and *H. dimorphum* Norrl. Probably, *H. amaurochlorellum* Zahn (*Pflzr.* 1. c.; syn. *H. amaurochlorum* Zahn, *Hier. fl. Mosquens*, 1911, 15), described from the Moscow Region, should be included here. The type is unknown.

688. **H. onegense** Norrl. *Ant. öfv. Finl. Pilos.* I (1884) 131; Mela-Cajander, *Suom. Kasvio*, 648.—*Pilosella onegense* Norrl. *Medd. Soc. Fa. et Fl. Fenn.* II (1878) 147.—*H. flammeum* Norrl. *Fl. Karel. Oneg.* (1876) 158.—*H. pratense* Tausch ex Lbd. *Fl. Ross.* II (1844–1846) 850 p. p.; Krylov, *Fl. Zap. Sib.* XI, 3065, p. p.—*H. pratense* var. *silvicolum* Fr. *Symp.* (1848) 20; *Epicr.* 23.—*H. pratense* ssp. *brevipilum* N.P. Hier. *Mitteleur.* I (1885) 312.—*H. polonicum* Blocki in *Öster. Bot. Zeitschr.* (1887) 303.—*H. pratense* b. *silvicolum* Rupr. ex Schm. *Fl.* II (1897) 157.—*H. centrorossicum* Zahn, *Hier. d. Schweiz* (1906) 104; *Hier. fl. Mosquens.* 15.—*H. silvicola* (Fr.) Zahn in *Pflzr.* IV, 280, 1273; Asch. and Graebn. *Synopsis*, XII, I, 170 sub *H. eu-silvicola* Zahn.—**Ис.:** Syreistsch. *Fl. Mosk. Gub.* III (1910) 350.—**Exs.:** Zahn, *Hier. Europ.* No. 612; Baenitz, *Herb. Europ.* No. 1786; *Fl. Polon. exs.* No. 53a; *Fl. Austr.-Hung.* No. 3021; GRF No. 1289a, 2239a, c, 2240, 2241.

Perennial. Stem 50(25–70) cm high, 1.5–4.5 mm in diameter, reddish-violet at base, dark above; at base very densely pubescent with light-colored, downward-directed hairs 1.0–2.5 mm long, above with dense, dark, horizontally spreading bristles 1 mm long, moderately glandular above, scatteredly stellate-pubescent; stolons of two types: predominantly underground, thin, pale, with scale-like rudimentary leaves, very brittle, and above-ground with rosette of equal-sized, crowded leaves. Basal leaves 3(1–7) elliptical, spatulate, lingulate to lanceolate, obtuse to acute, sometimes with plicate tip, to 28 cm long (7:1), almost entire, light grass-green, on both sides densely pubescent, beneath along
602 midrib and as a whole very densely so, with soft hairs 0.5–1.0 mm long, above without stellate down, but beneath along midrib with occasional stellate down; cauline leaves 2–3(1–4) (coefficient of leafiness 0.05), lanceolate, acute (7:1), pubescence somewhat denser than on basal leaves, without stellate down above, to scatteredly stellate-downy beneath, eglandular or with occasional glands. Inflorescence compactly paniculate-umbellate, with 5–35 capitula; acladium 2–5 mm long; peduncles with sparse hairs, densely glandular, gray-tomentose; floral bracts dark, with whitish border. Involucres (5–)6(–7) mm long, cylindrical, with truncate base; involucre bracts narrow, acute, dark, with white border, hairs scarce to scattered, 21(10–30), and similarly, 17(8–35), glandular, glands 0.3–0.4 mm long (moreover, glands predominantly crowded in lower part), weakly stellate-pubescent.

Corollas yellow; stigmas dark. Flowering June to July. (Plate XXXI, Fig. 2.)

Forest glades and edges, meadows overgrown with shrubs, wet and floodplain meadows, meadow bogs around hummocks.—*European Part*: Karelia-Lapland (southern part, in Khibiny Mountains introduced!), Dvina-Pechora (southern part), Baltic Region (eastern part), Ladoga-Ilmen, Upper Volga, Volga-Kama, Upper Dnieper, Middle Dnieper, Volga-Don, Upper Dniester (very doubtful in the remaining southern and southeastern regions); *Western Siberia*: Ob Region, Upper Tobol, Irtysh, Altai; *Eastern Siberia*: Angara-Sayans. *General distribution*: Scandinavia (Finland, southeast), Central Europe (eastern part), Balkans-Asia Minor (western part). Described from Olonets part of Karelia. Type in Helsinki.

Note 1. In the floristic literature, until now *H. onegense* Norrl. has been combined with *H. pratense* (Tausch) Zahn, and, hence, from the literature it is impossible to have a precise idea about the distribution of either of these species. Based on a study of herbarium material of the Botanical Institute of the Academy of Sciences of the USSR, it was possible to establish that: 1) in the USSR *H. onegense* is found more often than *H. pratense*, and at places it, apparently, is the only member of the subsection; 2) in the east it reaches much farther than *H. pratense*; and 3) its characters are very stable, and the amplitude of their variation is relatively small. It grows very well in cultivation, spreading, and may overrun its neighbors. At the western limit of its range, despite luxuriant vegetative growth, it flowers poorly in unfavorable years (similar phenomenon observed also in *H. pratense*).

Besides short hairs, it is also distinguished from *H. pratense* by having almost twice as much pubescence.

Note 2. We include here the very closely related *H. perichlorum* Peter (*Nachr. K. Ges. Wiss. Götting*, Nos. 2, 1893, 69; Zahn, *Hier. fl. Mosquens.* 16; *Pflzr.* IV, 280, 1273). It differs from *H. onegense* Norrl. mainly by having denser pubescence (predominantly on the involucre bracts), exclusively lanceolate leaves, and very narrow involucre bracts that are up to scatteredly glandular. The type is unknown.

689. **H. dublitzkii** B. Fedtsch. and Nevski in Tr. Bot. Inst. Akad. Nauk SSSR, Ser. 1, 1 (1933) 208.

603 Perennial. Stem 25–65 cm high, 1–3 mm in diameter, hollow, violet at base, densely hairy below with light-colored, downward-directed hairs 1–3 mm long, thinning upward to sparse (in upper part hairs black and spreading), with scattered, fine glands above 0.2–0.4 mm long, down to middle of stem, moderately stellate-pubescent above; stolons as in *H. onegense* Norrl. Basal leaves 1–4, lanceolate, obtuse to short-acuminate, almost entire, to 14 cm long (4–7:1), light (yellowish)-green,

with pubescence moderate above with hairs 0.6–1.0 mm long, scattered along margin, dense beneath, with very dense hairs 1.5–2.0 mm long beneath along midrib, as a whole densely pubescent, to sparsely stellate-pubescent above, scatteredly so beneath; cauline leaves 2–3 (coefficient of leafiness 0.05), lanceolate, subacute, pubescence as on basal leaves, with stellate hairs scattered above, to moderate beneath (sometimes with occasional glands at tips). Inflorescence compactly umbellate-paniculate, with 10[2–14(22)] capitula; acladium to 10 mm long; peduncles with sparse, black hairs 1.5–4.0 mm long, moderately glandular with glands 0.3 mm long, gray-tomentose. Involucres 6.0–7.5 mm long, cylindrical; involucral bracts narrow, subacute, dark, with whitish-green border, with scattered, 25(20–37), black hairs 1–3 mm long, and with sparse, 16(10–27), glands 0.3–0.4 mm long, sparsely stellate-pubescent. Corollas bright yellow; stigmas yellow, later browning. Flowering June to August.

Subalpine meadows, birch, spruce, fir and larch forests in montane zone.—*Western Siberia*: Altai; *Eastern Siberia*: Angara-Sayans, Dauria; *Soviet Central Asia*: Dzhungaria-Tarbagatai, Tien Shan. *General distribution*: Dzhungaria-Kashgaria. Described from vicinity of Alma-Ata. Type in Leningrad.

Note. The absence (according to diagnosis) of stolons in *H. dublitzkii* is contradictory to the very nature of section *Pratensina*, and this question cannot be considered finally resolved. The stolons in *H. dublitzkii* can be largely underground and escape the attention of collectors. Moreover, the stolons of species of *Pratensina* are generally very brittle. The specimen collected by B.K. Schischkin in the Alma-Ata Region along the Dzhil-Karkara River, near the lower limit of the forest, on July 17, 1935, had a short stolon with leaves in a rosette (as in *H. onegense* Norrl.).

Cycle 3. Longiscapa Juxip.—Grex *H. longiscapum* N.P. Hier. Mitteleur. I (1885) 388, 395; Zahn in Pflzr. IV, 280, 1295.—*H. spathophyllum* B. [-] *H. eu-longiscapum* Zahn in Asch. and Graebn. Synopsis, XII, I (1929) 194.—Inflorescence paniculate-umbellate, acladium short, with 2–16 capitula; leaves moderately pubescent, hairs 1.0–1.5 mm long; in habit plants resemble those of *Pratenses*, but stigmas dark; plants from Caucasus (endemic to Caucasus-Asia Minor).

690. **H. longiscapum** Boiss. and Kotschy, Iter Cilic.-Kurd. suppl. (1859) No. 636, p. p.; Boiss. Fl. or. III, 864, sub *H. sabino* β *longiscapum*; 604 Peter in Nachr. K. Ges. Wiss. Götting. I (1898) 17; N.P. Hier. Mitteleur. I, 395; Zahn in Pflzr. IV, 280, 1295; Asch. and Graebn. Synopsis, XII,

I, 194; Grossh. Fl. Kavk. IV, 275.—(?) An *H. gochnati* C.A. Meyer, Verz. Pfl. Kauk. (1831) 59.

Perennial. Stem 20–35 cm high, 1–2 mm in diameter, at base up to densely pubescent with light-colored hairs 2–3 mm long, to sparse above and blackish, to moderately glandular above (glands down to middle of stem) and with very sparse stellate down; stolons elongated, to 10 cm, thin, with 4–5 relatively large leaves. Basal leaves 2–3, oblong, obtuse or subacute, almost entire, to 10 cm long (4–6:1), light green, with hairs to scattered on both sides and along margin, to very dense beneath along midrib, as a whole, moderately hairy with hairs 1.0–1.5 mm long, without stellate down, or with very sparse stellate down beneath; cauline leaves 1(–2) (coefficient of leafiness 0.04), mostly small. Inflorescence openly paniculate, with 2–10(–16) capitula; acladium 4–8 mm long; peduncles with occasional (sometimes to sparse) hairs, moderately (or to densely) glandular, grayish from stellate down; floral bracts dark, with whitish border. Involucres 6.5–8.0 mm long, cylindrical; involucre bracts somewhat broad, subobtusate, black, with whitish border, with sparse, 14(10–28), black hairs 1–2 mm long and sparse, 12(10–16), glands 0.5 mm long, almost without stellate down. Corollas dark yellow; stigmas dark. Flowering June to August.

Alpine meadows, from 1,600 to 2,650 m.—*Caucasus*: Ciscaucasia, Eastern and Western Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern part), Armenia-Kurdistan, Iran(?). Described from Asia Minor. Type in Geneva.

Note. In the density of pubescence, this species is similar to *H. pratense* Tausch, while in the type of short hairs it resembles *H. onegense* Norrl. with which it is undoubtedly phylogenetically related. However, Zahn included this species in the group (grex) of *H. spathophyllum*, probably based on the opinion of Naegeli and Peter. However, these authors only tentatively placed *H. longiscapum* Boiss. and Kotschy p. p. in this group. After having examined the material of this species in the Herbarium of the Botanical Institute of the Academy of Sciences of the USSR, we consider it necessary to include it in the affinity of *H. pratense*, treating it as the only member of a separate cycle.

Cycle 4. Floribunda Juxip.—*H. floribundum* Wimm. and Grab. Fl. Siles, II, 2 (1829) 204; Wimm. Fl. Schles. ed. 2, I (1844) 464, ed. 3 (1857) 304; Lindeb. in Hartm. Handb. 10 (1870) 2, 11 (1879) 36; N.P. Hier. Mitteleur. I, 688, 834; Zahn in Pflzr. IV, 280, 1284; Asch. and Graebn. Synopsis, XII, I, 185.—*H. florentinum-auricula-collinum* N.P. l. c.—*H. pratense* > *auricula* Zahn, l. c.—Inflorescence paniculate-umbellate, more or less compacted, later more open, with short acladium, mostly with many, 20(5–40), capitula; leaves sparsely pubescent,

almost without stellate down; leaves glaucous; corollas yellow, peripheral ones sometimes with red teeth (transition to *Blyttiana*); stigmas dark; plants with ascending runners or with stolons as in *H. auricula* (only larger), with leaves increasing in size toward tip of stolons or largest leaves in middle; inflorescence markedly glandular, glands larger than in *Pratenses* (0.5–0.8 mm long). About half of the examined specimens had mature pollen.

Note. Most authors consider the species of *Floribunda* as intermediate between the sections *Pratensina*, *Praealtina*, and *Auriculina*. For example, the less hairy but densely glandular, low-growing species resemble *H. auricula*, differing, however, by having hairs on the involucre bracts and dark stigmas. They are similar to *H. piloselloides* Vill. s. 1. in stature and less hairiness; however, they differ by having denser glands, a small number (1–2) of cauline leaves, and broader, partly spatulate leaves. In case of doubt, one must consider the ratio of length to width of leaves, which in *Praealtina* is 10–13:1, whereas in *Floribunda* it does not exceed 9:1, mostly just 6–7:1.

Mistakes are made more frequently in identifying the more or less distinctly pubescent forms, which often are identified as *H. pratense* and in addition are given such epithets as “glabrum” or “luxurians.” It is useful to keep in mind that even in the most pubescent specimens of *Floribunda* the pubescence of the leaves is confined to the proximity of the leaf margins (roughly to one-third of half the width of the leaf), and never does it spread over the entire width of the leaf. Besides, the glands in the inflorescence of *Floribunda* are larger and thicker (0.5–0.8 mm long) than those in *H. pratense* s. l., where they are shorter (0.3–0.4 mm long) and thinner.

The pubescence of the stem is concentrated mostly in its lower part (60–70% of all specimens examined), but there are specimens in which the pubescence of the stem is denser at the base and below the inflorescence but less dense in the middle (roughly in the ratio of 40:20:40).

691. *H. baenitzii* N.P. Hier. Mitteleur. I (1885) 694; Zahn in Pflzr. IV, 280, 1285; Asch. and Graebn. Synopsis, XII, I, 186.—Exs.: Baenitz, Herb. Europ. No. 6320; Zahn, Hier. Europ. No. 542.

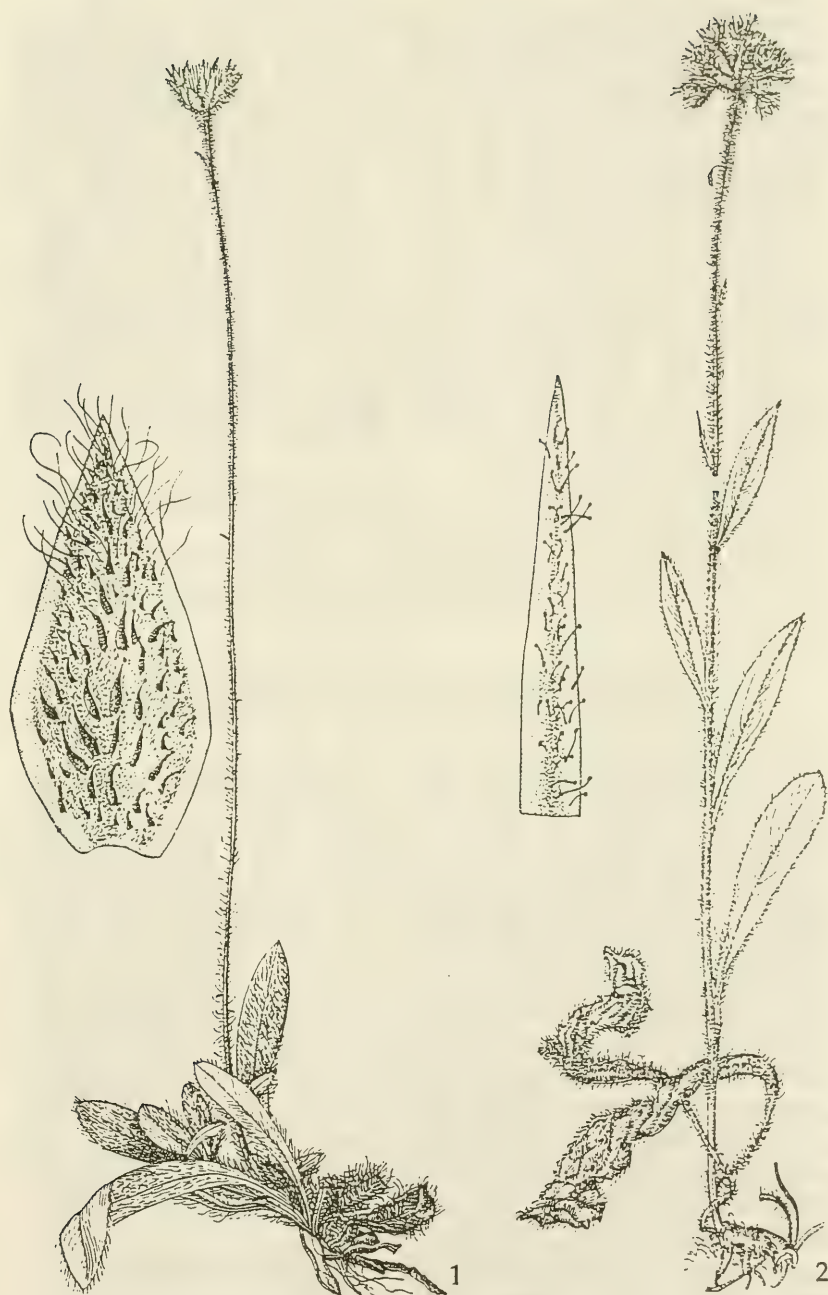
Perennial. Stem 45(25–85) cm high, 1.5–3.0 mm in diameter, with very sparse hairs (almost glabrous) in lower part, with sparse hairs 1 mm long above, glands sparse above, quickly thinning to none, without stellate down, with well-developed runners. Basal leaves 7–8(3–14) outer spatulate, very finely toothed, inner leaves (to narrowly) lanceolate, acute, entire, to 17 cm long (10:1), glaucous, glabrous on both sides, with occasional hairs along margin and beneath along midrib, as

a whole very sparsely pubescent, without stellate down; cauline leaves 3(2–5) (coefficient of leafiness 0.06), lanceolate, acute. Inflorescence paniculate, with 20(5–40) capitula; acladium 3–7 mm long; peduncles almost glabrous, sparsely glandular, gray from stellate down; floral bracts dark, with lighter border. Involucres 6–7(–9) mm long, cylindrical; involucre bracts somewhat broad, acutish, black, with narrow white border, with occasional, 5(0–10), light-colored hairs 1–2 mm long, and to scattered, 25(10–40), glandular, with very sparse stellate hairs. Corollas light yellow, sometimes peripheral ones with reddish or dull greenish teeth; stigmas dark. Flowering June to July.

Wet, moss-covered meadows and scrubs.—*European Part*: Baltic Region, Ladoga-Ilmen. *General distribution*: Central Europe (eastern part). Described from vicinity of Kaliningrad (former Königsberg). Type in Munich.

692. **H. floribundum** N.P. Hier. Mitteleur. I (1885) 693; pro ssp.; Zahn in Pflzr. IV, 280, 1285; Asch. and Graebn. Synopsis, XII, I, 187, sub *H. eu-floribundum* Zahn.—*H. pratense* γ. *luxurians* Schweinf. Herb. Fl. Ingricae, No. 372c.—*H. pseudopratense* Uechtr. ex Fieck. Fl. Schles. (1881) 269, p. p.—*H. podolicum* Blocki in Fl. Austr. Hung. exs. No. 3054; nec Rehm.—**lc.**: Syreistsch. Fl. Mosk. Gub. III (1910) 360; **Exs.**: Baenitz, Herb. Europ. Nos. 1306, 1492, 1783, 6097; Callier, Fl. Siles. exs. Nos. 853, 1121, 1248; Dörfler, Herb. norm. No. 4557; Fl. Austr. Hung. exs. No. 3054 (sub *H. podolicum* Blocki); Zahn, Hier. Europ. Nos. 136, 432, 627; GRF Nos. 1822, 1823 p. p., 2227a, b.

Perennial. Stem 40(20–70) cm high, 1–4 mm in diameter, hollow, often reddish-brown above, to densely pubescent with black hairs 2.5–4.0 mm long, denser at base and in upper part, sparsely to very densely glandular (glands down to middle of stem) and sparsely stellate-pubescent above, without down in lower part, with elongated, thin, decumbent runners (resembling collateral stems) or with short, underground stolons and creeping stolons with rosette of quite large, petiolate leaves at end. Basal leaves 6(3–12), outer spatulate-lanceolate, obtuse, inner broadly lanceolate, subobtuse to acute, to 12 cm long (4–8:1), entire, sometimes with plicate tip, glaucous, with occasional hairs 1.0–1.5 mm long on both sides near margin (middle part of leaf glabrous), with hairs scattered along margin, dense beneath along midrib, 1.5–2.0 mm long, as a whole scatteredly pubescent, without stellate down or with very sparse down only beneath along midrib; cauline leaves 1–2(–3) (coefficient of leafiness 0.04), lanceolate, pubescence as on basal leaves. Inflorescence paniculate-umbellate, later more open, with 10(3–25) capitula; acladium 5–7 mm long; peduncles glabrous or with occasional hairs, moderately to densely glandular, gray-tomentose; floral



bracts dark, with lighter border. Involucres (6-)7-8(-9) mm long, cylindrical; involucral bracts blackish, somewhat broad, subobtuse, almost without border or somewhat broad, acute, with indistinct border (*γ. petropolitanum* N.P.), or narrow, acuminate, with lighter border 609 (*β. rossicum* N.P.), with more or less sparse, 16(8-26), black hairs 2.0-2.5 mm long, and sparse, 16(10-30), glands 0.5-0.7 mm long, very sparsely stellate-pubescent. Corollas golden yellow, teeth sometimes reddish; stigmas dark. Flowering June to July (Plate XVII, Fig. 2.)

Wet, turfy meadows, pastures, alvars, old fields, banks of irrigation canals and railway tracks.—*European Part*: Karelia-Lapland (southern part), Dvina-Pechora (southern part), Baltic Region, Ladoga-Ilmen, Upper Volga, Volga-Kama (western part), Upper Dnieper, Middle Dnieper, Volga-Don, Upper Dniester. *General distribution*: Scandinavia, Central Europe (with center of distribution in Baltic Region). Described from Silesia. Type in Munich.

Note. A highly polymorphic species, its glandularity and pubescence are subject to particularly large variations.

The plants tolerate considerable soil acidity. The leaves are sometimes infected by the fungus *Puccinia hieracii* (Schum.) Mart. It is found as an introduced plant in Sakhalin.

693. **H. sudavicum** N.P. Hier. Mitteleur. I (1885) 691; Zahn in Pflzr. IV, 280, 1286; Asch. and Graebn. Synopsis, XII, I, 189.—**Exs.**: Baenitz, Herb. Europ. No. 7031; Zahn, Hier. Europ. Nos. 541, 818.

Perennial. Stem 20-60 cm high, 1-3 mm in diameter, scatteredly pubescent with soft bristles 4-5 mm long, above with occasional, glands, quickly thinning above, moderately stellate-pubescent above, sparsely below; stolons elongated, thin, as in *H. pratense*. Basal leaves 6-7(3-14), almost linear-lanceolate, acute, sinuate, often with plicate tip, glaucous, pubescent only along margin and beneath along midrib with bristles 1.5-2.5 mm long, as a whole very sparsely pubescent, without stellate down; cauline leaves 1-2 (coefficient of leafiness 0.04). Inflorescence openly paniculate, with 3-13 capitula; acladium 8-13 mm long; peduncles moderately white-pubescent, scatteredly glandular, grayish; floral bracts whitish. Involucres 8-9 mm long, cylindrical; involucral bracts narrow, subobtuse, black, with white border, with appreciable, scattered, 20(15-30), white, silky, soft hairs 2.0-2.5 mm long, and occasional, 6(2-10), glands, with very sparse stellate down. Corollas light yellow. Flowering June to July.

European Part: Baltic Region. Endemic. Described from vicinity of Lyk (former eastern Prussia). Type in Munich.

694. **H. regiomontanum** N.P. Hier. Mitteleur. I (1885) 692; Zahn in Pflzr. IV, 280, 1286; Asch. and Graebn. Synopsis, XII, I, 189.—**Exs.:** Callier, Fl. Siles. exs. No. 1248; Baenitz, Herb. Europ. Nos. 6097, 6650.

Perennial. Stem 20–65 cm high, 1.5–3.0 mm in diameter, moderately pubescent with hairs light-colored in lower part and dark in upper part
610 2–3 mm long, moderately glandular above with quickly thinning glands, scatteredly stellate-pubescent; stolons thin, often partly subterranean. Basal leaves oblong-lanceolate, obtuse to subacute, sinuate, glaucous, on both sides (near margin) with hairs occasional, along margin and beneath along midrib scattered, 1.0–1.5 mm long, as a whole sparsely pubescent, with sparse stellate down only beneath along midrib; cauline leaves 1–3 (coefficient of leafiness 0.05), lanceolate, with occasional glands. Inflorescence compactly umbellate-paniculate, with 8(6–20) capitula; acladium 2–3 mm long; peduncles conspicuously to scatteredly pubescent, densely glandular, white- or gray-tomentose; floral bracts dark, with light border. Involucre 7.5–8.5 mm long, ovate, with truncate base; involucre bracts somewhat broad, acute, black, with lighter border, with scattered, 20(15–38), light-colored hairs 1.5–2.0 mm long and scatteredly, 17(10–33), glandular, sparsely stellate-pubescent. Florets dark yellow. Flowering June to July.

Wet meadows.—*European Part:* Baltic Region, Upper Dniester. *General distribution:* Central Europe (eastern part). Described from vicinity of Kaliningrad (former Königsberg). Type in Munich.

695. **H. suecicum** (Fr.) N.P. Hier. Mitteleur. I (1885) 695; Zahn in Pflzr. IV, 280, 1286; Asch. and Graebn. Synopsis, XII, I, 189.—*H. suecicum* Fr. Symb. (1848) 16; Epicr. 20; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I, 51; Beitr. Hier.-Fl. Oesels, 18; Lindm. Svensk. Fan.-Fl. 2 ed. 594; Norrl. in Mela-Cajander, Suom. Kasvio, 637.—*Pilosella suecica* Sz. in Flora (1862) 425; Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 92.—*H. auricula* Griseb. Comm. rev. (1852) 9.—**Exs.:** Fr. Herb. Europ. No. 14; Norrl. Hier. Pilos. Fenn. Nos. 24, 25, 27, 28; Herb. exs. fasc. II, Nos. 46–49, fasc. III, No. 73, fasc. X, Nos. 8–16, 24–30; Dahlst. Hier. Scand. VII, 20, 61, VIII, 15–18, XIII, 13, 14; Hier. exs. I, 21; Zahn, Hier. Europ. Nos. 724, 818; GRF Nos. 1824, 2229.

Perennial. Stem 30(10–75) cm high, 1–3 mm in diameter, often brownish above, pubescence either from moderate to dense with bristles 2 mm long (var. *valdepilosum* N.P.) or sparse (var. *parcepilum* N.P.), sparsely to densely glandular above (in latter case glands reaching almost to base), scatteredly to sparsely stellate-pubescent; stolons elongated, thin, as in *H. auricula*. Basal leaves 6–7 (3–14), spatulate, to lanceolate, with rounded tip, spinescent, sometimes plicate, entire or finely toothed, to 18 cm long (7–8:1), glaucous, with sparse hairs

1.0–2.5 mm long only along margin and beneath along midrib, as a whole very sparsely pubescent, without stellate down; cauline leaves 1–2 (coefficient of leafiness 0.04), lanceolate, acute. Inflorescence openly paniculate, with 5–6 (2–26) capitula; accladium 4–12 mm long; peduncles almost glabrous, moderately glandular, gray-tomentose; floral bracts dark, with white border. Involucres (6.5–)7.5–8.5(–9.0) mm long, cylindrical, with rounded base; involucre bracts narrow, attenuate to subobtusate cusp, blackish, with narrow white border, with sparse, 611 12(3–30), dark hairs 1.0–1.5 mm long and equally sparse, 16(4–36), glands 0.5–0.8 mm long, very sparsely stellate-pubescent. Corollas dark yellow, sometimes with reddish teeth; stigmas dark. Flowering June to July. (Plate XXXIII, Fig. 1.)

Wet turfey meadows, edges of meadows and marshy ditches, pastures, gravelley hummocks, alvars, seaside meadows.—*European Part*: Dvina-Pechora (southern part), Baltic Region, Ladoga-Ilmen, Upper Volga, Upper Dnieper, Volga-Don. *General distribution*: Scandinavia, Central Europe (eastern part). Described from Sweden. Type in Uppsala?

Note. Found in Khibiny Mountains as an introduced plant. See Note 2 to *H. spathophyllum* N.P. regarding difficulties arising in the identification of this species.

Cycle 5. Scandinavica Juxip.—*H. scandinavicum* Dahlst. in Acta Horti Bergian. I, 7 (1891) 11, II, 4 (1894) 31; Zahn in Pflzr. IV, 280, 1289.—*H. stellatum* Lindeb. Hier. Scand. (1868) No. 8 and in Hartm. Handb. Scand. 10 (1870) 20 pro var.—*H. floribundum*—*H. floribundum* grex *Amblycephalum* N.P. Hier. Mitteleur. I (1885) 697.—*H. floribundum* > *ambiguum* Zahn in Pflzr l. c.

It differs from *H. floribundum* Wimm. and Grab., similar in habit, by conspicuous stellate pubescence on all parts (stem, peduncles, involucre bracts and dorsal side of leaves).

696. **H. renidescens** Norrl. Nya nord. Hier. I (1904) 67; Zahn in Pflzr. IV, 280, 1289.—**Exs.**: Norrl. Hier. exs. fasc. IV, No. 12.

Perennial. Stem 40–60 cm high, 2–3 mm in diameter, violet at base, dark above, quite densely pubescent below with hairs 1–2 mm long, above with occasional bristles 2.0–2.5 mm long, moderately glandular above, glands thinning downward to middle of stem, densely stellate-pubescent above, down thinning downward; stolons underground. Basal leaves oblong-lanceolate, acute, almost entire, grass-green, glaucescent (yellowish-green in dry condition), with occasional hairs 1.0–1.5 mm long above, scatteredly pubescent beneath, without stellate down above, with scattered down beneath (along midrib and

margin) or leaves completely without stellate down; cauline leaves (1-)2-3 (coefficient of leafiness 0.04), bottom leaf like basal, upper small, sessile, narrowly lanceolate, with small glands beneath along midrib and margin. Inflorescence paniculate, with 8-13 capitula; peduncles with occasional bristles, densely glandular, with alternating small and large glands, gray-tomentose. Involucres 8 mm long; involucre bracts narrow, subacute, with pale cusp, dark, narrowly pale green, with occasional hairs, moderately glandular, at base distinctly stellate-pubescent at tip without stellate down. Corollas sulfur yellow; stigmas dull yellow or brownish. Flowering June to July.

- 612 Edges of fields, wet meadows, herb slopes.—*European Part*: Dvina-Pechora (western part). Endemic. Described from banks of Onega River. Type in Helsinki.

697. **H. glomeratiforme** Zahn in Sched. HFR V (1906) No. 1275; Pflzr. IV, 280, 1290 (nota).—**Exs.**: GRF No. 1275.

Perennial. Stem 30-45 cm high, 1.5-2.5 mm in diameter, rather densely pubescent with white bristles 3-4 mm long, with occasional glands, moderately stellate-pubescent; stolons short, thin, above-ground, with remote, quite large leaves. Basal leaves 4-6, lanceolate, subobtusate to acute, to 7 cm long (5.7:1), glaucescent, scattered-pubescent on both sides, moderate beneath along margin and midrib, without stellate hairs above, with sparse stellate down beneath; cauline leaves (1-)2-3 (coefficient of leafiness 0.06). Inflorescence openly umbellate-paniculate, with 5-15 capitula; acladium 2-8 mm long; peduncles with occasional hairs, scatteredly glandular, gray-tomentose; floral bracts dark, with light border. Involucres 5.0-6.0 mm long, cylindrical, later truncate; involucre bracts somewhat broad, subobtusate, dark, with light border, with occasional, 7(5-13), light-colored hairs 1.5 mm long and occasional, 14(11-15), glands 0.4 mm long, moderately stellate-pubescent. Corollas yellow, concolored. Flowering June to July.

Dry meadows.—*European Part*: Upper Volga. Endemic. Described from Kalinin District. Type in Leningrad.

698. **H. muratoveönse** Zahn in Sched. HFR VII (1911) 97, No. 2228 sub *H. floribundo*; Pflzr. IV, 280, 1290.—**Exs.**: GRF No. 2228.

Perennial. Stem 30-45 cm high, 1.0-2.5 mm in diameter, with occasional bristles having dark base, with sparse glands above, scatteredly stellate-pubescent; stolons elongated, thin, decumbent with lanceolate leaves and very often with rudimentary inflorescence at tip, often abortive. Basal leaves 5-6, spatulate to lanceolate, obtuse to acute, to 7 cm long (9-10:1), glaucescent, with very sparse bristles 1-2 mm long along margin and beneath along midrib, without stellate down above,

scattered stellate down along midrib beneath (often purple-colored) and along margin; cauline leaves 2–3 (coefficient of leafiness 0.07). Inflorescence umbellate-paniculate, initially compressed, later more open, with 5–20 capitula; acladium to 5 mm long; peduncles without or with occasional hairs, sparsely glandular, grayish-tomentose. Involucres 5.0–6.5 mm long, cylindrical-ovate, later becoming compressed; involucre bracts narrow, to subacute, dark, with narrow green border, with occasional, 7(4–11), hairs to 2 mm long, hairs dark toward tip, with sparse, 13(10–20), glands 0.5–0.8 mm long, scatteredly stellate-pubescent. Corollas yellow, tubular; stigmas yellow. Flowering June to July.

613 Herb slopes.—*European Part*: Volga-Don. Endemic. Described from Bolkhov District of Orlov Region. Type in Leningrad.

699. ***H. curvulatum*** Zahn in Pflzr. IV, 280 (1923) 1290.—*H. curvatum* Peter in Nachr. K. Ges. Wiss. Götting. 2 (1893) 75; Zahn, Hier. fl. Mosquens. 24.

Perennial. Stem to 20 cm high, sparsely pubescent with hairs 2–4 mm long, rather densely glandular, densely stellate-pubescent above; stolons long, thin. Basal leaves spatulate, rounded-obtuse to narrowly lanceolate and acute, with only sparse hairs 1–3 mm long along margin and beneath along midrib, without stellate down above, scatteredly stellate-pubescent beneath; cauline leaves 1–2 (coefficient of leafiness 0.07). Inflorescence compactly umbellate-paniculate, with 4–8 capitula; peduncles with sparse hairs, rather densely glandular, white-tomentose. Involucres 8 mm long; involucre bracts somewhat broad, subobtusate, dark, with light border, moderately pubescent, moderately glandular, densely stellate-pubescent. Flowering June to July.

European Part: Upper Volga. Endemic. Described from Moscow Region. Type unknown.

Subsection 2. Flagellares Juxip.—Characters in key to subsections of section *Pratensisina*.

Representatives of this subsection are partly hybrids and partly hybridogenous species between sections *Pratensisina* and *Auriculina* or *Pratensisina*—*Pilosellina*. Moreover, apparently the instances of multiple hybridization are also quite common. As a result, a large number of forms has evolved, which are linked through intermediates and are distinguished from each other by minor characters, making their identification extremely difficult. It is particularly difficult to distinguish forms related to the highly polymorphic *H. pilosella* L. whose involvement [in hybridization] has a leveling effect on the characters inherited from section *Pratensisina*.

1. Inflorescence very openly paniculate or shallowly dichotomous, with 7(3–12)–20) capitula; acladium mostly more or less long (to 20% of stem length).....2.
- + Inflorescence deeply or (less frequently) shallowly dichotomous, with few, 2–3(1–6), capitula; acladium long (20–50% of stem length) to very long (70–90% of stem length); leaves very densely stellate-pubescent beneath.....27.
2. Leaves sparsely or very sparsely pubescent.....3.
- + Leaves to scatteredly pubescent.....21.
3. Leaves very sparsely pubescent, i.e., glabrous at first glance4.
- + Leaves sparsely pubescent.....11.
4. Acladium short (2% of stem length); leaves entirely without stellate down.....5.
- + Acladium longer (8–20% of stem length); inflorescence with 2–5 capitula (few-headed).....7.
5. Hairs and glands on involuclal bracts more or less equal in number; involucre 8–9 mm long.....708. **H. isthmicola** Norrl.
- + Either hairs or glands significantly more numerous on involuclal bracts; involucre 7.5–8.0 mm long.....6.
6. Hairs and glands on involuclal bracts in ratio 80:20.....709. **H. pseudauricula** N.P.
- + Hairs on involuclal bracts either completely absent or occasional (in latter case ratio of hairs to glands roughly 15:85)710. **H. subauricula** N.P.
- 7 (4). Acladium 8–10% of stem length; leaves scatteredly or very sparsely stellate-pubescent beneath.....8.
- + Acladium 20% of stem length; leaves moderately to sparsely stellate-pubescent beneath; inflorescence with 2–4 capitula; involucre 7–8 mm long.....715. **H. callimorphoides** Zahn
8. Either hairs or glands predominate on involuclal bracts; involucre 9 mm long.....9.
- + Hairs and glands on involuclal bracts more or less equal in number; involucre 7–8 mm long.....10.
9. Involuclal bracts moderately hairy but very sparsely (sometimes reduced to no glands glandular (ratio of hairs to glands on average 90:10).....711. **H. chlorops** N.P.
- + Involuclal bracts glabrous or with occasional down, to densely glandular (ratio of hairs to glands on average 5:95).....712. **H. flagellariforme** G. Schneider
10. Leaves almost glabrous, with occasional stellate down beneath (or sometimes without stellate down).....713. **H. callimorphopsis** Zahn

- + Leaves scatteredly pubescent, with scattered stellate down beneath.....714. **H. progenitum** Norrl.
- 11 (3). Acladium short, on average, 2–3% of stem length; stigmas yellow.....12.
 - + Acladium, on average, 12(3–20%) of stem length; stigmas somewhat dark; stellate pubescence on dorsal side of leaves scattered.....20.
- 12. Stellate pubescence on dorsal side [of leaves] absent or very sparse (along midrib).....13.
 - + Stellate pubescence on dorsal side of leaves moderate; inflorescence openly paniculate, with 4–15 capitula.....707. **H. callimorphum** N.P.
- 13. Involucres of moderate length, 7–9 mm.....14.
 - + Involucres shorter, 6–7 mm long.....17.
- 14. Involucral bracts with sparse hairs; corollas of peripheral florets with reddish teeth.....700. **H. fulvescens** N.P.
- 615 + Involucral bracts with sparse (to occasional) hairs; corollas concolored.....15.
- 15. Stigmas yellow.....16.
 - + Stigmas dark; leaves with short, very sparse to dense hairs 1 mm long along midrib beneath; floral bracts grayish705. **H. ladogensense** Norrl.
- 16. Leaves sparsely pubescent.....
 -701. **H. spathophyllum** subvar. **majoriceps** N.P.
 - + Leaves as a whole to scatteredly pubescent; to densely so beneath along midrib (hairs 2 mm long); leaves pale green.....704. **H. xanthostigma** Norrl.
- 17 (13). Involucral bracts hairy (to sparsely).....18.
 - + Involucral bracts glabrous (only with glands).....19.
- 18. Hairs on involucral bracts light-colored; floral bracts dark, with light border.....701. **H. spathophyllum** N.P.
 - + Hairs on involucral bracts dark; floral bracts light-colored.....702. **H. brachycephalum** Norrl.
- 19. Glands in inflorescence more or less large (0.4–0.5 mm long), black.....703. **H. longatum** Peter
 - + Glands in inflorescence very small (0.2–0.3 mm long), yellowish.....706. **H. pubens** N.P.
- 20 (11). Involucral bracts black, with inconspicuous border, obtuse, with sparse, black hairs, almost without stellate down; leaves sparsely pubescent above, without stellate down above, to scatteredly pubescent beneath.....716. **H. subnigriceps** Zahn
 - + Involucral bracts dark, with light border, acute, with moderate dark hairs, more or less densely stellate-pubescent; leaves to

- scatteredly pubescent, with sparse stellate down above, to moderate beneath.....717. **H. floridum** N.P.
- 21 (2). Leaves densely stellate-pubescent beneath; glaucous; involu-
 cral bracts almost glabrous, to scatteredly glandular (ratio of
 hairs to glands roughly 1:4); stigmas dull yellow.....
718. **H. apatelium** N.P.
- + Leaves up to moderately stellate-pubescent beneath, light
 green (or slightly glaucescent); stigmas yellow.....22.
22. Hairs on involucre bracts many more than glands (hairs and
 glands in ratio of 4:1); glands occasional.....23.
- + Hairs and glands on involucre bracts more or less equal in
 number.....24.
23. Involucres 7.0–8.5 mm long; floral bracts dark; involucre bracts
 with conspicuous light border, with scattered black hairs.....
719. **H. tephrantheloides** Zahn
- 616 + Involucres 10–11 mm long; floral bracts light-colored; involu-
 cral bracts with inconspicuous border, like peduncles, quite
 densely hairy with white or ochereous hairs.....
720. **H. gnaphalium** N.P.
24. Involucres more or less large, 10–11 mm long; floral bracts
 green with white border.....721. **H. guttenfeldense** Zahn
- + Involucres shorter (6–10 mm long).....25.
25. Involucres 8–10 mm long.....26.
- + Involucres 6–8 mm long.....722. **H. mohrungenense** Zahn
26. Involucre bracts narrow, with whitish or greenish, narrow
 border; leaves light green; floral bracts gray.....
723. **H. prussicum** N.P.
- + Involucre bracts broad, with wide, green border; leaves
 glaucescent; floral bracts light-colored.....
724. **H. casparyanum** N.P.
- 27 (1). Acladium (10–)30–50% of stem length; inflorescence shallowly
 or deeply dichotomous.....28.
- + Acladium 70–90% of stem length; inflorescence deeply
 dichotomous.....35.
28. Hairs on involucre bracts much more numerous (3:1) than
 glands; peripheral corollas on outside with purple
 stripes.....29.
- + Hairs and glands on involucre bracts more or less equal in
 number or glands distinctly predominate.....30.
29. Involucres 9–11 mm long; corollas yellow.....
725. **H. petunnikovii** Peter
- + Involucres 8.5 mm long; corollas orange-yellow.....
726. **H. prognatum** Norrl.

30. Hairs and glands on involuclral bracts more or less equal in number.....31.
 + Glands on involuclral bracts predominate over hairs or hairs completely absent.....34.
31. Involucres 10–11 mm long.....727. **H. homostegium** Norrl.
 + Involucres 7.5–10.0 mm long.....32.
32. Leaves and stem sparsely pubescent; corollas light golden yellow, peripheral ones with bright purple stripes on outside.....728. **H. chrysophthalmum** Norrl.
 + Leaves and stem scatteredly pubescent.....33.
33. Involuclral bracts moderately pubescent; plants from the North.....729. **H. inceptans** Norrl.
 + Involuclral bracts scatteredly to sparsely pubescent; plants from Carpathian Mountains.....730. **H. tatrense** N.P.
- 617 34 (30). Hairs on involuclral bracts scattered to occasional, glands moderate (glands clearly predominate over hairs).....
731. **H. flagellare** (Willd.) N.P.
 + Hairs on involuclral bracts (almost) absent; glands to dense732. **H. pseuduliginosum** Zahn
- 35 (27). Leaves to scatteredly pubescent.....36.
 + Leaves to moderately pubescent; stigmas dark; plants from Caucasus.....42.
36. Plants growing in immediate vicinity of species of cycle *Praticola* or *Silvicola*, mainly in central or eastern part of European territory of Soviet Union.....37.
 + Plants growing in immediate vicinity of species of cycle *Floribunda*, i.e. mainly in the western or northwestern regions of European territory.....40.
37. Involucres (9–)10–12 mm long.....733. **H. cernuiforme** N.P.
 + Involucres shorter, 8–10 mm long.....38.
38. Peduncles conspicuously (moderately) pubescent.....
734. **H. aurosulum** Norrl.
 + Peduncles sparsely pubescent (hairs to occasional); leaves narrowly lanceolate.....39.
39. Involucres 9–10 mm long; involuclral bracts very acute.....
735. **H. moscoviticum** Peter
 + Involucres 8–9 mm long.....736. **H. amoeniceps** Zahn
- 40 (36). Involucres 10–12 mm long; involuclral bracts broad; leaves more or less broadly lanceolate.....737. **H. piloselliflorum** N.P.
 + Involucres 7–9 mm long.....41.
41. Involucres 7–8 mm long; involuclral bracts sparsely glandular; leaves more or less broadly lanceolate.....
738. **H. microsphaericum** Zahn

- + Involucres 8–9 mm long; involucre bracts to densely glandular; leaves narrowly to linear-lanceolate.....739. **H. stenozon** Zahn
- 42 (35). Involucres 8–9 mm long; stolons more or less short.....740. **H. levieri** Peter
- + Involucres 10–11 mm long; stolons long.....741. **H. abakurae** Schelk. and Zahn

Cycle 6. Spathophylla Juxip.—*H. spathophyllum* N.P. Hier. Mitteleur. I (1885) 386, 806.—*H. collinum-auricula* N.P. l. c.—*H. pratense-auricula* Zahn in Koch, Synopsis, 3, III (1901) 1724.—Grex *H. spathophyllum* (N.P.) Zahn in Pflzr. IV, 280 (1923) 1291; Asch. and Graebn. Synopsis, XII, I, 191; sub *H. eu-spathophyllum*.—Inflorescence openly paniculate or shallowly dichotomous, with 7(3–20) 618 capitula; leaves glaucescent-light green, as a rule, sparsely pubescent; acladium short, 2–3% of stem length; stigmas yellow (to somewhat dark); stellate pubescence of leaves absent beneath or very sparse (along midrib); stolons as in *H. auricula* (only as a whole larger), well developed, rarely with rudimentary inflorescence, sometimes partly underground, leaves increasing in size toward tip of stolon; unlike in *H. floribundum*, runners extremely rare.

Species found in the range of *H. pratense* and *H. auricula* and often, apparently, of hybrid origin.

700. H. fulvescens N.P. Hier. Mitteleur. I (1885) 394; Zahn in Pflzr. IV, 280, 1291; Asch. and Graebn. Synopsis, XII, I, 192.—**Exs.:** Hier. Naeg. No. 125; GRF No. 1839.

Perennial. Stem 20–60 cm high, 1.5–2.0–3.0 mm in diameter, slightly ascending, to moderately pubescent with light-colored hairs 3–5 mm long (subvar. *pilosum* N.P.) or with occasional hairs 2 mm long (subvar. *epilosum* N.P.), scatteredly glandular above, glands gradually thinning downward, sparsely stellate-pubescent; stolons elongated, thin, with more or less large leaves, partly underground. Basal leaves (2), spatulate to lanceolate, obtuse to subacute, to 15 cm long (7:11), glaucescent, pubescence on both sides sparse to occasional setose, with soft bristles 2–3(–4) mm long, scattered along margin, moderate along midrib, as a whole sparse, without stellate down; cauline leaves 0–1(–2) (coefficient of leafiness 0.02), without stellate down (or sometimes with very sparse down) beneath along midrib. Inflorescence very openly paniculate, with 3–8 capitula; acladium 5–25 mm long; peduncles with occasional hairs, rather densely glandular, gray-tomentose; floral bracts dark, with bright white border. Involucres 7.5–8.0 mm long, ovate, later truncate; involucre bracts narrow, acute, dark, white-bordered, with

sparse, 12(9–18), light-colored hairs 1.5–2.0 mm long, sparsely, 12(6–20), glandular, glands 0.5 mm long, scatteredly stellate-pubescent. Corollas dark yellow, peripheral ones with reddish teeth; stigmas yellow. Flowering June to July.

Meadows.—*European Part*: Baltic Region, Ladoga-Ilmen. *General distribution*: Central Europe (eastern part). Described from cultivated specimen from St. Petersburg. Type in Munich.

Note. *H. limbatum* N.P. (*Hier. Mitteleur.* I, 1885, 395; Zahn in *Pflzr.* IV, 280, 1292; Asch. and Graebn. *Synopsis*, XII, I, 193.—**Exs.**: *Hier. Naeg.* No. 175) is so similar to this species that it probably should be included under *H. fulvescens* N.P. as a synonym. It was described from a cultivated specimen from the St. Petersburg Botanical Garden. Besides, it is found in the Baltic Region (Riga). The type is in Munich.

Possibly, *H. polysarcoides* Zahn (*Pflzr.* IV, 280, 1292) and *H. leopolitanum* Zahn (*Pflzr.* l. c.; syn. *H. leopoliense* × *Auricula blockii* exs.) also should be included under *H. fulvescens* N.P.; both are distinguished from *H. fulvescens* by having broader involucre bracts. They were described from Galicia. *H. polysarcoides* is also found in the Lithuanian SSR (Nyankov, Vilnius). The type is in Lvov.

701. *H. spathophyllum* N.P. *Hier. Mitteleur.* I (1885) 388; Norrl. in *Mela-Cajander, Suom. Kasvio*, 639; Zahn in *Fedtsch. and Flerow, Fl. Evrop. Ross.* 1079; Zahn, *Hier. fl. Mosquens.* 23; *Pflzr.* IV, 280, 1292; Asch. and Graebn. *Synopsis*, XII, I, 193.—**lc.**: *Syreistsch. Fl. Mosk. Gub. III* (1910) 352, 353.—**Exs.**: *Hier. Naeg.* No. 156; Zahn, *Hier. Europ. Nos.* 215, 715, 820–822; GRF No. 1840.

Perennial. Stem 20–60 cm high, 1–2 mm in diameter, scatteredly pubescent in lower part, sparsely above (subvar. *pilosius* N.P.) with hairs 3–4 mm long (f. *macrotrichum* N.P.) or 1–2 mm long (f. *microtrichum* N.P.), or stem with sparse hairs 1.0–1.5 mm long (subvar. 2. *calvius* N.P.), sparsely to densely glandular above, glands thinning downward, moderately stellate-pubescent above, up to very sparsely so below, stolons long, to 15 cm, thin, with 4–8 spatulate leaves. Basal leaves 1–4, spatulate, rounded-obtuse to spatulate-lanceolate, with spiniform cusp, somewhat glaucescent, to 15 cm long (6–8:1), on both sides with occasional hairs near and along margin, with scattered bristles 2–3 mm long beneath along midrib, as a whole sparsely pubescent, with stellate down beneath only along midrib and that too very sparse; cauline leaves 1–3(–4) (coefficient of leafiness 0.06), lanceolate, short-acuminate. Inflorescence compactly umbellate-paniculate with 4–20 capitula; acladium 3–7 mm long; peduncles glabrous or with occasional hairs, scatteredly to densely glandular,

gray-tomentose; floral bracts dark, with white border. Involucres 6–7 mm long, rarely larger, 7.5–9.0 mm (subvar. 3. *majoriceps* N.P.), cylindrical; involucre bracts somewhat narrow, subobtusate, blackish with indistinct light border, with very sparse, 10(4–15), light-colored hairs 1.0–1.5 mm long and sparse, 20(14–22), glands 0.4–1.0 mm long, to scatteredly stellate-pubescent. Corollas dark yellow, concolored; stigmas yellow. Flowering June to July.

Wet meadows, forest edges and scrubs.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Volga, Upper Dniester. *General distribution*: Scandinavia (Finland), Central Europe. Described from Munich, from a spontaneous hybrid. Type in Munich.

Note 1. It appears necessary to include here *H. riganum* Syreis. and Zahn, *Hier. Europ.* No. 716 (*Pflzr.* IV, 280, 1923, 1292; Asch. and Graebn. *Synopsis*, XII, I, 193), described from the Latvian SSR (Kemeru). The type is unknown.

Note 2. *H. spathophyllum* N.P. is considered to be a hybrid species, intermediate between *H. pratense* Tausch and *H. auricula* Lam. and DC. Despite the different lines of evolution of *H. spathophyllum* and *H. suecicum* Fr., in habit they have so much in common that distinguishing between them is very difficult and requires special attention. Reports by some authors (for example, Th. Lippmaa, *Beiträge Zur Kenntnis der Flora u. Vegetation Südwest-Estlands*, 1931, 204) about the more or less dense stellate pubescence beneath along the midrib, particularly on the cauline leaves of *H. spathophyllum*, in contrast to *H. suecicum* Fr., in which it is absent, indicates the hairs are not a very reliable character because of the great variation. The most reliable differences are the color of the stigmas—yellow in *H. spathophyllum* and dark in *H. suecicum*; the involucres—6–7 mm long and weakly pubescent in *H. spathophyllum* and larger, 7.5–8.5 mm and darkly pubescent in *H. suecicum*; and, finally, more or less light-colored leaves in *H. spathophyllum* and more bluish ones in *H. suecicum*. The last character, like the denser pubescence of the leaves and stem is, however, not constant and cannot be relied upon.

702. ***H. brachycephalum*** Norrl. Anteckn. öfv. Finl. Pilos. (1884) 97; Mela-Cajander, Suom. Kasvio, 639; N.P. Hier. Mitteleur. I, 391; Zahn, Hier. fl. Mosquens. 23; *Pflzr.* IV, 280, 1293; Samuelsson, Maps of Scand. Hier. sp. (1954) No. 2.—**Exs.**: Norrl. Herb. Pilos. Fenn. I, Nos. 29–31; H. Lindberg, Pl. Finl. exs. Nos. 1597.

Perennial. Stem 25–40 cm high, 1.0–1.5 mm in diameter, ascending, dark above (sometimes even the whole length), reddish-brown, at base with scattered, upward with occasional, short hairs 1 mm long, above to moderately glandular (glands thinning down to middle of stem) and

with scattered stellate down, without stellate down below; stolons long, to 10 cm, thin, with 4–6 spatulate leaves. Basal leaves 3–7, spatulate to lanceolate, obtuse to short-acuminate, plicate, glaucescent, to 8 cm long (4–6:1), on both sides glabrous, along margin with sparse, beneath along midrib with scattered hairs 1 mm long, as a whole very sparsely pubescent and only beneath along midrib with occasional stellate down; cauline leaves 0–1 (coefficient of leafiness 0.02), lanceolate, acute. Inflorescence openly paniculate, with 3–6 capitula; acladium 6–7 mm long; peduncles (almost) glabrous, scatteredly glandular, gray-tomentose; floral bracts light-colored. Involucres 6–7 mm long, cylindrical, with truncate base; involucre bracts narrow, obtuse, blackish-green, with whitish border and sparse, 18(15–20), dark hairs 1.0–1.5 mm long, with sparse. 13(8–16), glands 0.6 mm long, almost without stellate down. Corollas light yellow, peripheral ones with reddish teeth; stigmas dull brown, dark. Flowering June to July.

Wet meadows and slopes.—*European Part*: Ladoga-Ilmen, Upper Volga. *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. Zahn referred subvariety *calviceps* (= *H. maurochlorum* Norrl.) to this species. However, given the complete absence of hairs on the involucre bracts and peduncles and the density of glands, it would be better to transfer this plant to *H. auricula* Lam. and DC.

703. ***H. longatum*** Peter in Nachr. K. Ges. Wiss. Götting. 2 (1893) 621 75; Zahn, Hier. fl. Mosquens. 23; Pflzr. IV, 280, 1293.

Perennial. Stem (15–)30–40 cm high, sparsely pubescent with hairs 2–3 mm long, moderately glandular above, glands thinning downward, with sparse stellate down; stolons as in *H. auricula*. Basal leaves spatulate to lanceolate, rounded-obtuse to subacute, short, glabrous on both sides, along margin and beneath on midrib with sparse cilia 1–3 mm long, as a whole very sparsely pubescent, sparsely stellate-pubescent only beneath; cauline leaves 1. Inflorescence paniculate, with 6–12 capitula; acladium short; peduncles glabrous, to densely glandular, grayish-tomentose. Involucres 6–8 mm long, cylindrical; involucre bracts somewhat narrow, obtuse, dark, with white border, glabrous, densely glandular, almost without stellate down. Florets yellow; stigmas dark. Flowering June to July.

Wet meadows.—*European Part*: Upper Volga. Endemic. Described from Moscow Region. Type unknown.

704. ***H. xanthostigma*** Norrl. Pilos. bor. (1895) 42; Mela-Cajander, Suom. Kasvio, 641 (nota); Zahn in Pflzr. IV, 280, 1294.—**Exs.**: Norrl. Hier. exs. fasc. II, No. 50, fasc. III, Nos. 80–84.

Perennial. Stem 30–45 cm high, 2 mm in diameter, dark above, at base moderately pubescent with light-colored hairs 1–2 mm long, greatly thinning upward, densely glandular above (glands down to middle of stem), very sparsely stellate-pubescent; stolons elongated, to 27 cm, with spatulate leaves (9) sometimes subterranean, abortive. Basal leaves 6–7, spatulate to lanceolate, to 11 cm long, wide (4–5:1), short-acuminate, pale green, on both sides with occasional hairs 1 mm long, hairs sparse near and along margin, along midrib beneath with dense hairs 2 mm long, as a whole scatteredly pubescent, completely without stellate down; cauline leaves 1 (coefficient of leafiness 0.02), small, lanceolate, acute. Inflorescence paniculate, with 3–9 capitula; acladium 5–7 mm long; peduncles glabrous or with occasional hairs, densely glandular, gray-tomentose. Involucres 8–9 mm long, cylindrical; involucre bracts narrow, subobtuse, dark, with inconspicuous border, with sparse, 14(10–25), hairs 2.0–2.5 mm long and equally sparse, 14(10–26), glands 0.5–0.7 mm long, almost without stellate down. Corollas light yellow, sometimes with reddish teeth; stigmas yellow or somewhat dull brown when dry. Flowering June to July.

Dry herb slopes, thin meadows.—*European Part*: Ladoga-Ilmen (northern part). *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki; paratype in Leningrad.

Note. It differs from the very close *H. subpratense* Norrl., which occurs in Finland, mainly by the pale green color and relative width of the leaves.

To the species described here we probably should refer *H. oeneoratum* Norrl. (*Nya. nord. Hier.* I, 1904, 42; Mela-Cajander, 622 *Suom. Kasvio*, 641; *Pflzr.* l. c.), distinguished by its dark green leaves, smaller (7 mm long) involucres and lower (25–30 cm) height. It was described from the Karelian Isthmus (Ladoga-Ilmen); *H. nemoriculum* Norrl. (*Pilos. bor.* 1895, 46; Mela-Cajander, l. c.; *Pflzr.* l. c.), also found there, is distinguished by its dull brown stigmas which later turn dark. The types are in Helsinki.

705. **H. ladogense** Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 136; Mela-Cajander, *Suom. Kasvio*, 641; N.P. Hier. Mitteleur. I, 392; Zahn in *Pflzr.* IV, 280, 1295.—**Exs.**: Norrl. Herb. Pilos. Fenn. I, No. 75; Hier. exs. fasc. III, No. 96, fasc. V, No. 22; GRF No. 1295; H. Lindberg. Pl. Finl. exs. No. 1604.

Perennial. Stem 25–50 cm high, 1.5–2.5 mm in diameter, dark above, densely pubescent with light-colored hairs 1.0–2.5 mm long, mostly densely glandular above (glands often down to middle of stem) and scatteredly stellate-pubescent; stolons long, to 13 cm, bearing upto 6 leaves, sometimes underground or rudimentary. Basal leaves 2–7, spatulate-lanceolate, obtuse, light glaucous-green, to 16 cm long (5–8:1),



entire or sometimes very finely toothed, on both sides with hairs occasional or absent near margin, sparse along margin, to dense beneath along midrib, as a whole with up to scattered hairs 1 mm long, without stellate down or very sparse stellate pubescence beneath along midrib; cauline leaves 1–2 (coefficient of leafiness 0.05), lanceolate, subobtusate or short-acuminate, without stellate down above, often with sparse stellate down beneath. Inflorescence compact-umbellate, with 3–11 capitula; acladium 6 mm long; peduncles with occasional hairs, densely glandular, gray from stellate down; floral bracts gray. Involucres 7.0–7.5 mm long, ovate; involucre bracts somewhat broad, subobtusate, black, with white or green border, with sparse, 21(18–35), dark hairs 2.0–2.5 mm long with gray tips and sparse, 21(15–50), black glands 0.3–0.4 mm long, almost without stellate down. Corollas light or dark yellow; stigmas dark, at least when dry. Flowering June to July.

Meadows and herb slopes.—*European Part*: Karelia-Lapland (southern part), Baltic Region, Ladoga-Ilmen (northern part). *General distribution*: Scandinavia (Finland). Described from Karelia. Type in Helsinki.

706. **H. pubens** N.P. Hier. Mitteleur. I (1885) 392; Norrl. in Mela-Cajander, Suom. Kasvio, 642; Zahn in Pflzr. IV, 280, 1295.

625 Perennial. Stem 20–25 cm high, 1.0–1.5 mm in diameter, very sparsely pubescent with hairs 1 mm long, above scatteredly glandular (occasional glands reaching to base), scatteredly stellate-pubescent above. Basal leaves spatulate-lanceolate, rounded-obtusate, plicate, glaucous, on both sides glabrous, along margin and beneath along midrib moderately pubescent, as a whole sparsely so with hairs 1.0–1.5 mm long, without or with occasional stellate down beneath along midrib; cauline leaves 1–2 (coefficient of leafiness 0.07), lanceolate, without down above, conspicuously pubescent beneath along midrib. Inflorescence openly paniculate, with 3–4 capitula; acladium 4–7 mm long; peduncles glabrous, densely glandular, gray from stellate down; floral bracts light gray, with white border. Involucres 6.5–7.0 mm long, ovate; involucre bracts narrow, subacute, dark, with whitish border, glabrous, with dense, very fine, yellowish glands, with scattered stellate down. Corollas dark yellow; stigmas dark. Flowering June to July.

Meadows.—*European Part*: Ladoga-Ilmen (northern part). *General distribution*: Scandinavia (Finland). Described from the Karelian Isthmus. Type in Munich.

Note. Probably, we should include here the [following] species described by Norrlin from the banks of the Svira (Ladoga-Ilmen): *H. subpubens* Norrl. (*Norrl. Pilos. bor.* 1895, 43; Mela-Cajander, *Suom.*

Kasvio, 642; *Pflzr.* IV, 280, 1295), *H. subswirens* Norrl. (*Pilos. bor. op. cit.* 45; Mela-Cajander, l. c.; Zahn, in *Pflzr.* l. c.), *H. swirens* Norrl. (*Herb. Mus. Fenn.* 1889, and *Hier. exs. fasc.* III, No. 90; Mela-Cajander, l. c.; Zahn in *Pflzr.* l. c.) and *H. papyrodes* Norrl. (*Pilos. bor. op. cit.* 45; Mela-Cajander, l. c.; Zahn in *Pflzr.* l. c.). The types are in Helsinki.

Cycle 7. *Callimorpha* Juxip.—*H. callimorphum* N.P. Hier. Mitteleur. I (1885) 396, 808; Zahn in *Pflzr.* IV, 280, 1304; Asch. and Graebn. Synopsis, XII, I, 202.—*H. collinum*—*Auricula*—*Pilosella* N.P. l. c.—*H. longiscapum* > *pilosella* Zahn, l. c.—In habit and characters resembling those of cycle *Spathophylla*, distinguished by having quite conspicuous (moderate) stellate pubescence on dorsal side of leaves; stolons with remote, small leaves, decreasing toward tip.

Found mainly in the western regions of the European territory of the Soviet Union.

707. *H. callimorphum* N.P. Hier. Mitteleur. I (1885) 396; Zahn in Fedtsch. and Flerow, *Fl. Evrop. Ross.* 1080; Zahn, Hier. fl. Mosquens. 24; *Pflzr.* IV, 280, 1304; Asch. and Graebn. Synopsis, XII, I, 202.

Perennial. Stem 25–50 cm high, 1.5–2.0 mm in diameter, hollow, sulcate, densely pubescent in lower part with light-colored hairs 3–5 mm long, thinning upward, glands sparse, scatteredly stellate-pubescent; stolons elongated, thin, above-ground, with small, remote leaves, becoming smaller toward tip of stolon. Basal leaves 4–8, spatulate to lanceolate, rounded-obtuse to acute, to 14 cm long, glaucescent, on both sides with scattered bristles 3–4 mm long, moderately hairy along margin with hairs 2.0–2.5 mm long, without stellate down above, moderately pubescent beneath (leaves grayish-green); cauline leaves 1–3
626 (coefficient of leafiness 0.05), lanceolate, in lower half of stem. Inflorescence very openly paniculate-umbellate, with 4–15 capitula; acladium 5–10(–16) mm long; peduncles scatteredly pubescent, scatteredly to sparsely glandular below, gray-tomentose; floral bracts gray or dark. Involucres 6.5–8.0 mm long, ovate-cylindrical; involucre bracts narrow, acute, dark, with inconspicuous border, with scattered to sparse, dark hairs 1 mm long, sparsely to scatteredly glandular, grayish from hairs, but margin glabrous. Corollas dark yellow, peripheral ones with reddish stripes outside; stigmas dull yellow. Flowering June to July.

Meadows.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Volga. *General distribution*: Central Europe (eastern part). Described from Bohemia. Type in Munich.

Cycle 8. *Cochleata* Juxip.—*H. cochleatum* N.P. Hier. Mitteleur. I (1885) 700; Norrl. in Mela-Cajander, *Suom. Kasvio*, 638; Zahn in *Pflzr.*

IV, 280, 1296; Asch. and Graebn. Synopsis, XII, I, 194.—*Pilosella cochlearis* Norrl. Antockn. öfv. Finl. Pilos. I (1881) 100.—*H. floribundum-auricula* N.P. l. c.—*H. pratense* < *auricula* Zahn l. c.—Inflorescence openly paniculate, with 4–6(–20) capitula; leaves very sparsely pubescent (mainly along margin and beneath along midrib) and entirely without stellate down; acladium short; stigmas yellow; distinguished from *H. auricula*, which is similar in habit, by taller growth, denser stem pubescence and hairs on involucre bracts.

708. **H. isthmicola** Norrl. *Nya nord. Hier.* (1904) 35; Mela-Cajander, *Suom. Kasvio*, 638; Zahn in *Pflzr.* IV, 280, 1297.—**Exs.:** Norrl. *Hier. exs.* fasc. III, No. 77, fasc. V, Nos. 18–20; Pl. Finl. exs. No. 1596.

Perennial. Stem 30–60 cm high, 2–4 mm in diameter, dark violet at base and above for the most part, to moderately pubescent in lower part with hairs 1–3 mm long, thinning upward, to densely glandular above with glands descending down to middle of stem, sparsely stellate-pubescent; stolons long, to 16 cm, violet, with 7–8 rather large leaves. Basal leaves 3–6, oblong or spatulate-lanceolate, rounded-obtuse to short-acuminate, partly plicate (leaves concave like spoon, hence their tips fold during drying), almost entire, glaucescent-light green, beneath often violet, to 17 cm long (6–8:1), short-pubescent (0.5–1.0 mm long) only along margin and beneath along midrib, as a whole very sparsely pubescent, without stellate down; cauline leaves 2 (coefficient of leafiness 0.04), lanceolate, upper leaf small. Inflorescence umbellate-paniculate, with 4–20 capitula; acladium 7–10 mm long; peduncles with very sparse bristles 1.5–2.0 mm long, moderately to densely glandular, glands 0.5 mm long, gray-tomentose. Involucres 8–9 mm long, cylindrical; involucre bracts narrow, acute, with wide, light-colored border, with sparse, 16(14–20), gray hairs 2 mm long, also
627 sparse, 15(10–25), glands 0.5 mm long, almost without stellate down. Corollas yellow, sometimes peripheral florets on outside somewhat reddish; stigmas dark when dry. Flowering June to July.

Wet meadows, sandy banks, along roads and ditches.—*European Part:* Ladoga-Ilmen (northern part). *General distribution:* Scandinavia (Finland). Described from Karelian Isthmus. Type in Helsinki; paratype in Leningrad.

Note. The following species should be included here as synonyms: *H. atroviolascens* Norrl. (*Pilos. bor.* 1895, 41; Mela-Cajander, *Suom. Kasvio*, 638; *Pflzr.* op. cit. 1298 (nota); Norrl. *Hier. Pilos. Fenn. fasc.* II, No. 166), described from the Karelian Isthmus; *H. oeneolivens* Norrl. (*Nya nord. Hier.* I, 1904, 35; Mela-Cajander, l. c.; Zahn in *Pflzr.* op. cit. p. 1297), described from the same place; and, finally, *H. declinans* Norrl. (*Nya nord. Hier.* II, 1912, 36; Zahn in *Pflzr.* op. cit. p. 1298),

described from the vicinity of Sortavala [Serdobol]. All of them are distinguished by minor and difficult to diagnose details (color and variable width of the leaves, pubescence of the stem, peduncles, involuclral bracts, and so forth) that are characteristic of *H. isthmicola* Norrl.; therefore, at most they may deserve the rank of varieties. The type are in Helsinki.

709. ***H. pseudauricula*** N.P. Hier. Mitteleur. I (1885) 700; Zahn in Pflzr. IV, 280, 1298; Asch. and Graebn. Synopsis, XII, I, 194.

Perennial. Stem 20–25 cm high, 1 mm in diameter, erect, with sparse to occasional, light-colored hairs above 2–3 mm long, with scattered glands above, thinning downward, scatteredly to sparsely stellate-pubescent; stolons elongated, thin. Basal leaves lanceolate, obtuse, spinescent, glaucous, with very sparse bristles 3–4 mm long along margin and beneath along midrib, without stellate down; cauline leaves 0–1 (coefficient of leafiness 0.02), near rosette. Inflorescence openly paniculate, with 2–5 capitula; acladium 7–8 mm long; peduncles with very sparse hairs, scatteredly glandular, gray from down. Involucres 7.5–8.0 mm long, cylindrical; involuclral bracts somewhat, broad, subacute, black, with white border, with scattered white hairs 1.5–2.5 mm long, very sparsely glandular and with sparse stellate down. Corollas yellow.

Meadows.—*European Part*: Baltic Region (southern part), Volga-Don, Upper Dniester. *General distribution*: Scandinavia (Finland), Central Europe (eastern part). Described from Galicia. Type in Munich.

710. ***H. subauricula*** N.P. Hier. Mitteleur. I (1885) 701; Zahn in Pflzr. IV, 280, 1298; Asch. and Graebn. Synopsis, XII, I, 195.—*Exs.*: Baenitz, Herb. Europ. Nos. 6657, 7030.

628 Perennial. Stem 15–45 cm high, 1.0–1.5 mm in diameter, with sparse, light-colored hairs 2–3 mm long, scatteredly glandular above, glands thinning downward, very sparsely stellate-pubescent; stolons elongated, thin, with many leaves. Basal leaves spatulate to lanceolate, obtuse, glaucous with very sparse bristles 3 mm long along margin and beneath along midrib, without stellate down; cauline leaves 0–1 (coefficient of leafiness 0.02), in rosette. Inflorescence openly paniculate, with 3–6 capitula; acladium 5–6 mm long; peduncles glabrous, moderately glandular, gray from stellate down. Involucres 7.5–8.0 mm long, cylindrical; involuclral bracts somewhat broad, subobtuse, black, with white border, glabrous or with occasional, 6(2–12), hairs 1.5–2.5 mm long, with scattered, 20(10–18), glands 0.6–1.0 mm long, sparsely stellate-pubescent. Corollas yellow. Flowering June to July.

Meadows.—*European Part*: Dvina-Pechora (southern part), Baltic Region (southern part), Ladoga-Ilmen, Upper Dnieper (?). *General distribution*: Central Europe (eastern part). Described from former East Prussia. Type in Munich.

Cycle 9. Flagellariformia Juxip.—*H. chlorops* N.P. Hier. Mitteleur. I (1885) 376; Zahn in Pflzr. IV, 280, 1282; Asch. and Graebn. Synopsis, XII, I, 182.—*H. prussicum-auricula* Zahn in Pflzr. I. c. and in Asch. and Graebn. I. c.—*H. flagellariforme* G. Schneid. Hier. Westsudet. (1889) 46, 119; Zahn, Hier. fl. Mosquens. 21; Pflzr. I. c. and in Asch. and Graebn. op. cit. p. 184.—*H. flagellare-auricula* G. Schneid. I. c.—Inflorescence shallowly dichotomous, with few (2–5) capitula; leaves very sparsely pubescent; acladium 8–10% of stem length; leaves scatteredly to sparsely stellate-pubescent beneath.

711. *H. chlorops* N.P. Hier. Mitteleur. I (1885) 376; Zahn, Hier. fl. Mosquens. 21; Pflzr. IV, 280, 1282; Asch. and Graebn. Synopsis, XII, I, 182.—*H. prussicum-auricula* Zahn, I. c.—*Exs.*: Baenitz, Herb. Europ. No. 8455; Zahn, Hier. Europ. Nos. 614, 614a.

Perennial. Stem 12–30 cm high, 1–2 mm in diameter, somewhat ascending, at base scatteredly pubescent with hairs 3–4 mm long, densely above, scatteredly glandular, densely stellate-pubescent in upper part, quickly thinning downward; stolons elongated, thin, with very few and very small leaves, subterranean. Basal leaves 4–6, oblong-lanceolate, subacute, to 7 cm long (5:1), light green, somewhat glaucescent, sparsely pubescent with hairs 2–3 mm long, stellate pubescence only beneath but rather dense; cauline leaves 1 (coefficient of leafiness 0.05), near rosette. Inflorescence shallowly dichotomous, with 2–3 capitula; acladium 10–15 mm long; peduncles slightly pubescent, scatteredly glandular, gray-tomentose; floral bracts light green. Involucres 8–9 mm long, ovate; involucre bracts narrow, acute, dark, with bright green border, with scattered, 30(20–40), hairs 1.0–1.5 mm long and sparse, 25(15–30), glands 0.4–0.5 mm long, with dense stellate down (margins glabrous). Corollas light yellow, peripheral ones sometimes with reddish stripes on outside; stigmas yellow. Flowering June to July.

European Part: Baltic Region (southern part), Upper Volga. *General distribution*: Central Europe (eastern part). Described from former East Prussia. Type in Munich.

629 712. *H. flagellariforme* G. Schn. Hier. Westsudet. (1889) 119; Zahn, Hier. fl. Mosquens. 21; Pflzr. IV, 280, 1282; Asch. and Graebn.

Synopsis, XII, I, 185 (sub. *H. eu-flagellariforme* Zahn).—*H. flagellare-auricula* G. Schn., l. c. and Zahn l. c.

Perennial. Stem up to 20 cm high, 1 mm in diameter, somewhat ascending, scatteredly to sparsely pubescent, moderately glandular, with dense stellate down above, thinning downward; stolons elongated, thin, with remote leaves, increasing toward tip, as in *H. auricula*. Basal leaves oblong or spatulate to lanceolate, obtuse to subacute, more or less glaucescent, sparsely pubescent with short cilia, with sparse stellate down only beneath or lacking it altogether; cauline leaves 1–2 (coefficient of leafiness 0.06), sometimes with occasional glands. Inflorescence shallowly dichotomous, with 2–4(–5) capitula; acladium 5–50 mm long; peduncles with occasional or sparse hairs, densely glandular, grayish from down; floral bracts gray or dark, with light-colored border. Involucres 9 mm long, ovate; involucre bracts somewhat narrow, dark, with wide, light-colored border, glabrous or with occasional hairs, to densely glandular, with very sparse stellate down. Corollas light yellow, concolored. Flowering June to July.

European Part: Baltic Region (southern part). *General distribution:* Central Europe (eastern part). Described from Sudeten. Type in Weimar?

Note. Probably, *H. niankowiense* Rehm. (in *Verh. zool.-bot. Ges. Wien*. XLV, 1895, 238; Zahn in *Pflzr.* l. c.) should be included in this species. It is distinguished by having larger (10–11 mm long) involucre and more conspicuous stellate pubescence; described from Nyankov (Lithuanian SSR). The type may or may not be in Lvov.

713. ***H. callimorphopsis*** Zahn, Hier. fl. Mosquens. (1911) 22; *Pflzr.* IV, 280, 1282; Asch. and Graebn. Synopsis, XII, I, 185.—**lc.:** Syreistsch. Fl. Mosk. Gub. III (1910) 352 (sub *H. flagellariforme*).—**Exs.:** Zahn, Hier. Europ. No. 714.

Perennial. Stem 20–25 cm high, 1 mm in diameter, ascending, scatteredly pubescent and scatteredly glandular, with dense stellate down above, thinning downward; stolons elongated, thin and soft, with remote, small leaves as in *H. auricula*. Basal leaves (5) spatulate, obtuse to more or less acute, tip often plicate, glaucescent, with occasional hairs and rare stellate down only beneath (sometimes without it); cauline leaves 1 (coefficient of leafiness 0.05), in rosette, lanceolate. Inflorescence shallowly dichotomous, with 2 capitula; acladium 15–30 mm long; peduncles with sparse soft hairs, to densely glandular, grayish from hairs. Involucres 7–8 mm long, ovate; involucre bracts narrow, subacute, dark, with inconspicuous (green) border, with scattered hairs 3 mm long and scatteredly glandular, with very sparse

stellate down. Corollas light yellow, peripheral ones with reddish teeth. Flowering June to July.

Meadows and scrubs, rare.—*European Part*: Baltic Region, Upper Volga. *General distribution*: Central Europe. Described from Moscow
630 Region. Type unknown.

Note. Apparently, *H. acrotrichum* Rehm. (*Verh. zool.-bot. Ges. Wien*. XLVII, 1897, 283; *Pflzr.* l. c.) should be included here. It is distinguished by having wide, obtuse involucre bracts with wide, light-colored border and leaves with dense stellate down beneath. Described from Galicia. Type may or may not be in Lvov.

714. **H. progenitum** Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 87; Mela-Cajander, Suom. Kasvio, 633; N.P. Hier. Mitteleur. I, 477 (sub *H. macranthelo*); *Pflzr.* IV, 280, 1280.—*Pilosella progenita* Norrl. Anteckn. l. c.—**Exs.**: Norrl. Hier. exs. fasc. I, No. 19.

Perennial. Stem 20–30 cm high, 1–2 mm in diameter, ascending, to scatteredly pubescent with bristles 2.5 mm long, thinning and shorter upward (to 1 mm long), scatteredly glandular above (glands thinning downward, reaching middle of stem), rather densely stellate-pubescent; stolons more or less elongated, thin. Basal leaves 3–4, lingulate to lanceolate, subobtuse to acute, glaucous, to 10 cm long (7:1), above and along margin sparsely pubescent with hairs 1.0–1.5 mm long, pubescence moderate beneath, scattered along midrib with hairs 1–2 mm long, as a whole scatteredly pubescent, above (almost) without stellate down, such hairs scattered beneath; cauline leaves 1(–2) (coefficient of leafiness 0.06), lanceolate, acute, upper leaf small. Inflorescence shallowly dichotomous, with 2–6 capitula; accladium 10–30 mm long; peduncles with sparse hairs 2.5 mm long, scatteredly glandular, gray-tomentose; floral bracts dark gray. Involucres 7.6–8.5 mm long, ovate, later subglobose; involucre bracts narrow, acute, dark, with narrow border and sparse, 25(23–27), light-colored hairs 1.0–1.5 mm long, with sparse, 20(13–28), glands 0.4 mm long, sparsely stellate-pubescent. Corollas light yellow, peripheral ones on outside with purple stripes and red teeth; stigmas dark. Flowering June to July.

Wet turf meadows, edges of fields and dry slopes.—*European Part*: Ladoga-Ilmen (northern part). *General distribution*: Scandinavia (Finland). Described from Karelian Isthmus. Type in Helsinki; paratype in Leningrad.

Cycle 10. Callimorphoidea Juxip.—*H. callimorphoides* Zahn in Sched. HFR V (1905) 21; *Pflzr.* IV, 280, 1304; Asch. and Graebn. Synopsis, XII, I, 203 (nota).—*H. pratense-auricula* × *pilosella* Zahn in Sched. l. c.—*H. longiscapum* > *pilosella* Zahn in *Pflzr.*; Asch. and

Graebn. l. c.—Leaves very sparsely pubescent (glabrous at first glance), scatteredly to sparsely stellate pubescent beneath; inflorescence shallowly dichotomous, with 2–4 capitula; acladium 20% of stem length.

715. **H. callimorphoides** Zahn in Sched. HFR V (1905) 21; Pflzr. IV, 280, 1304; Lotos, 74, 31, 37; Asch. and Graebn. Synopsis, XII, I, 203.—**Exs.:** GRF No. 1252, pro *H. apatelio*, No. 1257a, b.

631 Perennial. Stem 12–30 cm high, 1 mm in diameter, ascending, moderately pubescent with light-colored hairs, 2.5–3.5 mm long, glandular, glands thinning downward to base, distinctly stellate-pubescent; stolons above-ground, long, thin, with remote leaves becoming smaller toward tip or leaves almost of same size. Basal leaves 5–8, outer spatulate, obtuse, others lanceolate, acute, glaucescent, with occasional to sparse soft bristles, without stellate down above, sparsely to moderately stellate-pubescent beneath; cauline leaves 0–1 (coefficient of leafiness 0.02), in rosette. Inflorescence shallowly dichotomous, with two to four capitula; acladium 10–75 mm long; peduncles scatteredly hairy, scatteredly glandular, gray from stellate down; floral bracts dark, with light-colored border. Involucre 7–8 mm long, ovate-cylindrical, later compressed; involucre bracts narrow, subacute, dark, with light border, with sparse, 18(12–25), hairs 2–3 mm long and with sparse, 20(17–24), glands 0.5–0.6 mm long, moderately stellate-pubescent (margins glabrous). Corollas dark yellow; peripheral ones with reddish teeth (or concolored); stigmas yellow. Flowering June to July.

Meadows.—*European Part:* Baltic Region, Ladoga-Ilmen, Upper Volga, Volga-Don. *General distribution:* Central Europe (eastern part). Described from Velikie Luki District. Type in Leningrad.

Cycle 11. Nigricepsia Juxip.—*H. nigriceps* N.P. Hier. Mitteleur. I (1885) 702, non al.; Zahn, in Fedtsch. and Flerow, Fl. Evrop. Ross. 1092.—*H. floribundum* > *pilosella* N.P. l. c.—*H. iseranum* Uechtr. ap. N. P. op. cit. 705; Zahn in Pflzr. IV, 280, 1298; Asch. and Graebn. Synopsis, XII, I, 195.—*H. nigricans* Uechtr. in Nym. Consp. suppl. II (1889) 200.—*H. floribundum* var. *pullatum* Fr. Symb. (1848) 6; Epicr. 13 p. p.—Inflorescence shallowly dichotomous or openly paniculate, with 7(2–12) capitula; acladium 12(3–20)% of stem length; leaves sparsely pubescent, with scatteredly stellate-pubescent beneath; stigma somewhat dark.

Species of hybrid origin and sometimes, probably, even [simple] hybrids, representing forms analogous to *Prussica*. Distinguished from the latter by more sparse pubescence on all parts and glaucous leaves.

716. **H. subnigriceps** Zahn in Engl. Pflzr. IV, 280 (1923) 1299; Asch. and Graebn. Synopsis, XII, I, 196.—*H. nigriceps* N.P. Hier. Mitteleur. I (1885) 703, non al.; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1092.—*H. iseranum* Uechtr. in N.P. op. cit. 705 p. p.—**Exs.:** Callier, Fl. Siles. exs. Nos. 221, 1122; Baenitz, Herb. Europ. No. 1881.

632 Perennial. Stem 15–50 cm high, 1.5–2.0 mm in diameter, ascending, with dense hairs 1.5–2.0 mm long: light-colored in lower part and black in upper, sparsely glandular, to barely scattered-stellate pubescence; stolons long, to 10 cm, thin. Basal leaves 3–9, lower oblong-spatulate, with rounded tip, inner lanceolate, subacute, to 10 cm long (5–6:1), glaucescent, above with bristles 3–4 mm long close to margin, sparse along margin, more numerous beneath along midrib, as a whole sparsely pubescent, above without stellate down (or with occasional down along midrib) scatteredly pubescent beneath; cauline leaves 1–2 (coefficient of leafiness 0.03). Inflorescence very openly paniculate or shallowly dichotomous, with 2–8(–12) capitula; acladium 5–100 mm long; peduncles with moderate, black hairs 1.5–2.0 mm long, scatteredly glandular, gray from stellate down; floral bracts dark to gray. Involucres 8.0–9.5 mm long, more or less subglobose; involucre bracts somewhat broad, subobtusely, black, with inconspicuous border, with sparse, 23(14–32), black hairs 1.5–2.0(–3.0) mm long, sparsely to scatteredly, 30(18–36), glandular, glands 0.5–1.0 mm long, almost without stellate down, conspicuous only at base. Corollas yellow, peripheral ones with red stripes; stigmas yellow. Flowering June to July.

Meadows and pastures, old fields.—*European Part:* Baltic Region, Ladoga-Ilmen, Volga-Don, Upper Dniester. *General distribution:* Central Europe. Described from Silesia. Type in Munich.

717. **H. floridum** N.P. Hier. Mitteleur. I (1885) 704; Dahlst. Beitr. Hier.-Fl. Oesels, 18; Zahn in Pflzr. IV, 280, 1299; Asch. and Graebn. Synopsis, XII, I, 196.—**Exs.:** Callier, Fl. Siles. exs. No. 1249; Baenitz, No. 4309.

Perennial. Stem 15–35 cm high, 1.5–2.0 mm in diameter, with scattered to sparse hairs 2–5 mm long, light-colored in lower part, dark in upper, sparsely glandular and scatteredly stellate-pubescent above; stolons elongated, to somewhat thick. Basal leaves (6) lanceolate, broad to narrow, obtuse to acute, to 8 cm long, glaucescent, moderately pubescent on both sides (above with bristles 2–3 mm long), as a whole to scatteredly pubescent, very sparsely stellate-pubescent above, moderately so beneath; cauline leaves 1 (coefficient of leafiness 0.04), in rosette. Inflorescence openly paniculate, with 2–6 capitula; acladium 5–30(–60) mm long; peduncles scatteredly pubescent and scatteredly glandular, gray-tomentose; floral bracts light gray.

Involucres 7–9(–10.5) mm long, subglobose; involucral bracts somewhat broad, acute, dark, with light border, with scattered (30), dark hairs 1.5–2.5 mm long, and sparse (20) glands 0.4 mm long, densely stellate-pubescent. Corollas yellow, concolored. Flowering June to July.

Meadows and edges of deciduous forests.—*European Part*: Baltic Region (Saaremaa Island). *General distribution*: Central Europe (eastern part). Described from Silesia. Type in Munich.

Cycle 12. Apatelia Juxip.—*H. apatellum* N.P. Hier. Mitteleur. I (1885) 702, 706; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1092; Zahn, Hier. fl. Mosquens. 48; Pflzr. IV, 280, 1301; Asch. and Graebn. Synopsis, XII, I, 199.—*H. floribundum-pilosella* Zahn, l. c.—Inflorescence shallowly dichotomously paniculate, with 2–5(10) capitula; acladium 8–10% of stem length; leaves to scatteredly pubescent, densely
633 stellate-pubescent beneath; glaucous; involucres 9–13 mm long; stigmas dull yellow.

It is not easily distinguishable from *Flagellares*, an evolutionary analog. Naegeli and Peter (op. cit. p. 703) say that there are no sharp borders between *Nigricepsia* and *Apatelia*, as well as between the latter and *Piloselliflora*, because these cycles merge with each other imperceptibly, and, as a result, identification of the inseparable plants on the border of the transition is very difficult.

718. *H. apatellum* N.P. Hier. Mitteleur. I (1885) 706; Zahn in Pflzr. IV, 280, 1301; Asch. and Graebn. Synopsis, XII, I 199, sub *H. eu-apatellum* Zahn.—*lc.*: Syreistsch. Fl. Mosk. Gub. III (1910) 360.—*Exs.*: GRF No. 1252.

Perennial. Stem 15–40(–50) cm high, 1.5–3.0 mm in diameter, ascending, with sparse hairs 3–5 mm long, light-colored in lower part, dark above, glands scattered above, thinning toward base, with scattered stellate down; stolons long, to 10 cm, with rather large, spatulate leaves (3–10). Basal leaves 3–10, oblong-lanceolate, obtuse, glaucescent, to 12 cm long (6.5:1), with occasional, bristles 3–6 mm long above, to moderately hairy beneath (toward tip) along margin and midrib, as a whole scatteredly pubescent, without stellate down above, densely pubescent beneath; cauline leaves 1(–2) (coefficient of leafiness 0.03), in rosette. Inflorescence shallowly dichotomously paniculate, with 2–5(–10) capitula; acladium 10–13 mm long; peduncles sparsely pubescent, moderately glandular, gray-tomentose; floral bracts whitish, with occasional glands. Involucres 9–11 mm long, ovate-subglobose; involucral bracts somewhat broad, acute, dark, with light border, with occasional, 12(7–26), hairs 2.5 mm long, scatteredly, 31(18–40), glandular, glands 0.5 mm long, densely stellate-pubescent. Corollas

yellow; stigmas dull yellow. Flowering June to July. (Plate XXIX, Fig. 1.)

Forest edges and scrubs.—*European Part*: Baltic Region, Upper Volga, Volga-Don. Upper Dniester. *General distribution*: Central Europe. Described from Silesia. Type in Munich.

Note. Probably, here we should include *H. aupaense* N.P. (*Hier. Mitteleur.* I, 1885, 709; Zahn, *Hier. fl. Mosquens.* 49, sub *H. piloselliflora*; Pflzr. IV, 280, 1923, 1301; Asch. and Graebn. *Synopsis*, XII, I, 200.—**Exs.**: *Hier. Naeg.* No. 296; Zahn, *Hier. Europ.* No. 13, sub var. *β. pilosellifolium* Zahn), described from the Sudeten and found in our country in the vicinity of Moscow. It is distinguished from *H. apatelium* N.P. by having shorter (8 mm long) involucre and denser glands in the inflorescence. The type is in Munich.

H. apatelium is an evolutionary analog of *H. flagellare* Willd., differing from the latter by having a shallowly dichotomous inflorescence, glaucous leaves, and less pubescence on all parts.

Cycle 13. Prussica Juxip.—*H. prussicum* N.P. *Hier. Mitteleur.* I 634 (1885) 373, 804, pro *H. collinum* + *Pilosella*; Zahn in Fedtsch. and Flerow, *Fl. Evrop. Ross.* (1910) 1078; Pflzr. IV, 280, 1275; Asch. and Graebn. *Synopsis*, XII, I, 173.—*H. bifurcum γ. subcymosum* Froel. in DC. *Prodr.* VII (1838) 201 p. p.—*H. bifurcum* Klinggr. *Fl. Pruess.* (1848) 226.—*H. pratense* > *pilosella* Zahn in Pflzr.—Inflorescence openly paniculate to shallowly dichotomous, with 3–12 capitula; leaves to scatteredly pubescent, scatteredly to moderately stellate-pubescent beneath, light green or weakly glaucescent; involucre 9(7–11) mm long; stigmas yellow.

Not often found, but it usually is associated with putative parents, which indicates its hybrid origin. In habit, species of this cycle sometimes resemble more *Pratenses* (or *Silvicola*) and sometimes *H. pilosella* s. 1. and are distinguished from each other mainly by the vestiture.

719. *H. tephrrantheloides* Zahn in Pflzr. IV, 280 (1923) 1276; Asch. and Graebn. *Synopsis*, XII, I, 174.—**Exs.**: Baenitz, *Herb. Europ.* No. 1892.

Perennial. Stem 25–55 cm high, 2–3 mm in diameter, moderately pubescent below with light-colored hairs 4–5 mm long, above with scattered and black hairs, with occasional glands, grayish from down; stolons very elongated, rather thin. Basal leaves oblong-lanceolate to lanceolate, obtuse to acute, large, glaucescent, soft, on both sides with scattered bristles 3–4 mm long above, without stellate downy above, moderate stellate down beneath; cauline leaves 1 (coefficient of leafiness

0.03), at base of stem, lanceolate. Inflorescence shallowly dichotomous, with 3–12 capitula; acladium 15–20 mm long; peduncles scatteredly hairy, sparsely glandular with short glands, gray-tomentose; floral bracts dark. Involucres 7.0–8.5 mm long, cylindrical, with truncate base, later subglobose; involucre bracts more or less broad, acute, black, with clear light-colored border, with scattered, black hairs 2 mm long and occasional glands, moderately stellate-pubescent. Corollas light yellow, peripheral ones on outside often with red stripes. In habit, resembling *H. pratense* (Tausch) Zahn. Flowering June to July.

Meadows and forest edges.—*European Part*: Baltic Region (southern part). *General distribution*: Central Europe. Described from Königsberg (present Kaliningrad). Type not known.

Note. Probably, *H. lipnickianum* Rehm. (*Verh. zool.-bot. Ges. Wien*, XLV, 1895, 325; *Pflzr.* op. cit. 1277), described from Lithuania (Nyankov), should be included here. The type may or may not be in Lvov.

720. ***H. gnaphalium*** N.P. Hier. *Mittleur.* I (1885) 375; Zahn in *Pflzr.* IV, 280, 1277; Asch. and Graebn. *Synopsis*, XII, I, 175.—**Exs.**: Baenitz, *Herb. Europ.* Nos. 1784, 8456.

Perennial. Stem 15–35 cm high, 2–3 mm in diameter, very densely pubescent with white hairs 4–5 mm long, sparsely glandular above, glands thinning downward, densely stellate-pubescent above, scatteredly so below; stolons elongated, thin, densely pubescent, with
635 rather large leaves. Basal leaves oblong, subacute, to 12 cm long, or obovate (var. *β. zawadowiense* Rehm.), light green, soft, with occasional hairs above toward margin, hairs sparse beneath, scattered along margin, as a whole with scattered hairs 3–4 mm long, without stellate down above, moderate beneath; cauline leaves 2 (coefficient of leafiness 0.08), in lower half of stem. Inflorescence openly paniculate with 3–7 capitula; acladium 6–18 mm long; peduncles with rather densely white-pubescent, densely glandular, gray-tomentose; floral bracts light-colored. Involucres 10–11 mm long, cylindrical, with truncate base, later subglobose; involucre bracts more or less broad, acute, dark, with inconspicuous light border, with rather dense, white or ochreous hairs 2–3 mm long, (var. *β. zawadowiense* Rehm.) and occasional glands, sparsely stellate-pubescent. Corollas yellow. Flowering June to July.

Meadows and forest edges.—*European Part*: Baltic Region (southern part), Upper Dniester. *General distribution*: Central Europe (eastern part). Described from former East Prussia. Type in Munich.

721. **H. guttenfeldense** Zahn in Notizbl. Bot. Gart. und Mus. Dahlem. IX (1925) 410; Asch. and Graebn. Synopsis, XII, I, 177.

Perennial. Stem 30–35 cm high, to densely pubescent; scatteredly glandular and stellate-pubescent above; stolons elongated, rather thin. Basal leaves oblong, long-tapered to base, to 12 cm long (5:1), soft, light green, sparsely setose above, as a whole moderately setose, without stellate down above, scatteredly pubescent beneath; cauline leaves 1 (coefficient of leafiness 0.03). Inflorescence shallowly dichotomous, with 7–12 capitula; acladium 5–12 mm long; peduncles moderately pubescent, with scattered glands, gray-tomentose; floral bracts green, with white border. Involucres 10–11 mm long, thick; involucral bracts narrow, acute, greenish, with white border, with moderate light-colored hairs, to scatteredly glandular and scatteredly stellate-pubescent. Corollas yellow, peripheral ones with red stripes. Flowering June to July.

Meadows.—*European Part*: Baltic Region (southern part). Endemic. Described from vicinity of Königsberg (present Kaliningrad). The type may or may not be in Berlin.

722. **H. mohrungenense** Zahn in Asch. and Graebn. Synopsis, XII, I, 177.

636 Perennial. Stem 30 cm high, often with many collateral stems, scatteredly pubescent with short hairs (dark above), scatteredly glandular and sparsely stellate-pubescent above. Basal leaves spatulate-lanceolate to narrowly lanceolate, obtuse to acute, scatteredly pubescent above, with very short hairs, more densely pubescent at base, without stellate down above, to moderate beneath; cauline leaves 1–2 (coefficient of leafiness 0.05). Inflorescence shallowly dichotomous, with 5–10 capitula; acladium 15–40 mm long; peduncles scatteredly pubescent, to moderately glandular, gray-tomentose. Involucres 6–8 mm long; involucral bracts somewhat narrow, acute, with light-colored border, with scattered short hairs, moderately glandular with short glands, somewhat stellate-pubescent. Florets yellow. Flowering June to July.

Meadows and forest edges.—*European Part*: Baltic Region (southern part). Endemic. Described from former East Prussia. The type may or may not be in Berlin.

Note. It is very similar to *H. macroglossum* (Rehm. *Verh. zool.-bot. Ges. Wien*, XLV, 1895, 324; Asch. and Graebn. *Synopsis*, XII, I, 176; *H. macroglossoides* Zahn in *Pflzr.* IV, 280, 1278), which is distinguished by having very long ligules on the peripheral florets, somewhat more glands than hairs on the involucral bracts and peduncles, and involucres 6–7 mm long. Described from Lvov. The type specimen may be in Lvov.

723. **H. prussicum** N.P. Hier. Mitteleur. I (1885) 375; Zahn in Pflzr. IV, 280, 1277; Asch. and Graebn. Synopsis, XII, I, 175, sub *H. euprussicum* Zahn.—**Exs.:** Callier, Fl. Siles, exs. Nos. 31, 857, 1113; Baenitz, Herb. Europ. Nos. 5773, 6656, 7390; Zahn, Hier. Europ. Nos. 418, 823; GRF No. 1290.

Perennial. Stem 15–45 cm high, 1–3 mm in diameter, rather densely pubescent with light-colored hairs 2–6 mm long, with occasional glands, scatteredly stellate-pubescent; stolons more or less elongated, thin to somewhat thick. Basal leaves 5(3–10), more or less lanceolate, sub-acute to acute, to 12 cm long (7:1), light green, soft, on both sides with sparse bristles 2–4 mm long, with moderate pubescence along margin and beneath along midrib (and as a whole) with hairs 2 mm long, without stellate down above, to moderate down beneath; cauline leaves grayish-green, 1–2 (coefficient of leafiness 0.05), lanceolate, acute. Inflorescence openly paniculate to shallowly dichotomous, with 3–12 capitula; acladium 12–75 mm long; peduncles with sparse white hairs, with dense to quickly thinning glands; floral bracts gray, with white border. Involucres 8–10 mm long, ovate, with rounded base; involucre bracts narrow, acute, blackish, with whitish or greenish border, with sparse, 27(15–46), light-colored hairs 2–3 mm long, and sparse, 25(10–35)(–46), glands 0.5 mm long, scatteredly stellate-pubescent. Corollas yellow, often with reddish teeth or concolored; stigmas yellow, later dark. Flowering June to July. (Plate XXXVIII, Fig. 2.)

Meadows, forest edges, old fields.— *European Part:* Baltic Region, Upper Volga, Volga-Don, Upper Dnieper. *General distribution:* Scandinavia (southern part), Central Europe (eastern part). Described from vicinity of former Königsberg (present Kaliningrad). Type in Munich.

Note. Apparently, *H. acrochloium* Zahn (in *Sched. HFR*, VI, 1908, 87; *Pflzr.* IV, 280, 1278.—**Exs.:** *GRF* No. 1832), described from the Staritsa District of the Kalinin Region, should be included here as a synonym. The type is in Leningrad.

- 637 724. **H. casparyanum** N.P. Hier. Mitteleur. I (1885) 376; Zahn in Pflzr. IV, 280, 1278; Asch. and Graebn. Synopsis, XII, I, 176.—*H. brachiatum* var. *villarsii* Baenitz, Herb. Europ. No. 2536.—**Exs.:** Baenitz, No. 6655.

Perennial. Stem 30–40 cm high, 1.5–2.0 mm in diameter, with scattered, light-colored hairs 2–4 mm long in lower part, sparse above, black, with glands sparse above, quickly thinning downward, scattered to sparse stellate-pubescent; stolons very elongated, thin. Basal leaves more or less oblong-lanceolate, acute, glaucescent, soft, with occasional bristles 4 mm long above, almost glabrous beneath, as a whole

sparsely pubescent, without stellate down above, to scattered stellate down beneath; cauline leaves 1 (coefficient of leafiness 0.03), at base of stem, lanceolate. Inflorescence openly paniculate, with 8–10 capitula; acladium 8 mm long; peduncles with sparse hairs, scatteredly glandular, white-tomentose; floral bracts light-colored. Involucres 8.5 mm long, cylindrical, with rounded base; involucral bracts broad, acute, blackish, with wide green border, with scattered black hairs 2 mm long and sparse glands, scatteredly stellate-pubescent. Corollas dark yellow; without color on outside. Flowering June to July.

Meadows.—*European Part*: Baltic Region (southern part). Endemic? Described from vicinity of former Königsberg (present Kaliningrad). Type in Munich.

Cycle 14. Flagellaria Juxip.—*H. flagellare* Willd. Enum. hort. Berolin. suppl. (1813) 54; Rchb. Fl. Saxon. 173; Rehm. in Öster. Bot. Zeitschr. 106; N.P. Hier. Mitteleur. I, 378, 805; Arv.-Touv. Catal. 13; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1078; Zahn, Hier. fl. Mosquens. 18; Pflzr. IV, 280, 1278; Asch. and Graebn. Synopsis, XII, I, 177.—*H. pilosella* α . *stoloniflorum* Tausch in Flora, XI (1828) Erg.-Bl. 52 p. p.; Sudre, Hier. du Centre de la France (1902) 98, t. XXII.—*H. bifurcum* Rchb. Fl. Germ. exs. (1830) 261; Froel, in DC. Prodr. VII, 201 p. p.—*H. stoloniflorum* Koch, Synopsis, 2, II (1844) 510; Wimm. Fl. Schles. ed. 2, I, 460; Griseb. Comm. Hier. gen. 6; Fr. Epicr. 12.—*H. pilosello-pratense* F. Schultz, Fl. Pfalz. (1845) 278; Arch. fl. Fr. Allem. II, 177.—*Pilosella furcatum* Neilr. Nachtr. Fl. Wien. (1851) 172.—*Pilosella-stoloniflora* Sz. Sz. in Flora, XXI (1862) 423, cum descript.—*H. pratense-pilosella* F. Schultz (l. c); Zahn in Pflzr. l. c.; Asch. and Graebn. l. c.—*H. collinum-pilosella* N.P. op. cit.—Inflorescence deeply dichotomous, with (1–)2–6 capitula; acladium (10–)30–50% of stem length; involucres more or less large, (8–)9–11(–12) mm long, subglobose, broad; involucral bracts densely stellate-pubescent to gray-tomentose; peripheral corollas mostly with red stripes on outside; leaves along margin and beneath along midrib (close to base) more or less densely pubescent; stigmas yellow.

Species of hybrid origin that are scattered in the range of *H. pratense* s. l.; in particular, they occur in the Sudeten and Carpathian Mountains.

- 638 725. *H. petunnikovii* Peter in Nachr. K. Ges. Wiss. Götting. 2 (1893) 74; Zahn, Hier. fl. Mosquens. 19; Pflzr. IV, 280, 1281.

Perennial. Stem 12–30 cm high, moderately to very densely pubescent with hairs 3–5 mm long, light-colored in lower part, dark above; moderately glandular above, scatteredly stellate-pubescent; stolons as

in *H. flagellare* Willd. Basal leaves 7(3–9), oblong and rounded-obtuse to lanceolate and acute, to 8 cm long (4:1), light green, to moderately pubescent with soft hairs 3–5 mm long, above without stellate down, dense stellate down beneath (leaves grayish-green); cauline leaves 0(–1). Inflorescence shallowly or deeply dichotomous, with 2–3(–5) capitula; acladium $1/10$ – $3/4$ as long as stem; peduncles moderately pubescent, sparsely glandular, gray-tomentose. Involucres 9–11 mm long, ovate, later with truncate base; involucre bracts somewhat broad, acute, somewhat dark, with very light-colored border, with moderate, 54(46–64), black hairs 1.5–2.0(–3.0) mm long, sparsely, 23(13–35), glandular, glands 0.5 mm long, densely stellate-pubescent beneath, inconspicuously along margin. Corollas yellow, peripheral ones with red teeth; stigmas yellow. Flowering June to July.

Meadows.—*European Part*: Upper Volga. Endemic? Described from Moscow Region where it is found in many districts. Type in Leningrad.

Note. Here perhaps one should include as synonyms: *H. tweriense* Zahn (in *Sched. HFR* VI, 1908, 83; *Pflzr.* IV, 280, 1280; *GRF* No. 1821), described from the Staritsa District of the Kalinin Region and distinguished by somewhat denser pubescence and the purple color of the stolons, and *H. brachyschistum* Zahn (in *Sched. HFR* VI, 1908, 82; *Pflzr.* op. cit., p. 1279; *GRF* No. 1819), described from the Kalinin Region and distinguished by less pubescent leaves and stems. The types are in Leningrad.

726. *H. prognatum* Norrl. *Nya nord. Hier.* I (1904) 31; Zahn in *Pflzr.* IV, 280, 1280.—**Exs.**: Norrl. *Hier. exs. fasc.* III, No. 66.

Perennial. Stem 15–20 cm high, 1.5 mm in diameter, ascending, violet at base, very densely pubescent with hairs 2.5–3.0 mm long, particularly dense and downward-directed at base, densely glandular and tomentose above, with glands and down thinning downward; stolons above-ground, violet, pubescent, to 10 cm long, with 3 or 4 spatulate leaves. Basal leaves (5) oblong-spatulate to lanceolate, obtuse to acute, to 8 cm long (4.8:1), entire (or outer leaves finely toothed), dark green, with hairs 2.5 mm long above, along margin 1 mm long, scattered, moderate beneath, dense with hairs 1.5 mm long along midrib, as a whole to moderately pubescent, without stellate down above, densely so beneath; cauline leaves 0–1 (coefficient of leafiness 0.02), lanceolate, very densely stellate-pubescent only beneath. Inflorescence dichotomous with 3–4 capitula; acladium 5–50 mm long; peduncles with moderate grayish bristles, with dense glands 0.4 mm long, gray-tomentose. Involucres 8.5 mm long; involucre bracts somewhat narrow, acute, greenish, with whitish border and violet tip, with
639 scattered, 43(40–46), gray hairs 1.0–1.5 mm long, and sparse, 20(18–22),

glands 0.4 mm long, rather densely stellate-pubescent; corollas orange-yellow, peripheral ones with purple stripes on outside; stigmas dull yellowish, later turning dark. Flowering June to July.

Dry herb slopes.—*European Part*: Dvina-Pechora (southwestern part). Endemic. Described from banks of Sukhona River. Type in Helsinki; paratype in Leningrad.

Note. Three species described by Rehm from Galicia and Poland (*Verh. zool.-bot. Ges. Wien* XLV, 1895, 326, 327 and 330) approach this species: *H. anacraspedum* Rehm., *H. anisocephalum* Rehm. and *H. brachyacron* Rehm. Of these, the first was collected from the vicinity of Pinsk (Upper Dnieper), the second in Nyankov near Novogradok (Upper Dnieper); the latter two species are also known from the vicinity of Lvov (Upper Dniester) (Zahn, *Pflzr.* l. c.). The type may or may not be in Lvov.

727. **H. homostegium** Norrl. *Nya nord. Hier.* I (1904) 32; Zahn in *Pflzr.* IV, 280, 1280.—**Exs.**: Norrl. *Hier. exs. fasc.* III, No. 67.

Perennial. Stem 18–30 cm high, 1.5–2.0 mm in diameter, violet at base, brownish above, in lower part with scattered, in middle sparse, and above to scattered bristles, as a whole with dense bristles 2–4 mm long, densely glandular above (thinning down to middle of stem), tomentose above, with downward-thinning stellate pubescence; stolons above-ground, violet or partly subterranean. Basal leaves 4–5, oblong-lingulate to lanceolate, with short-acuminate, entire or very finely toothed, to 8 cm long (4.5–6.5:1), grassy-glaucous, often violet beneath, with occasional hairs 4 mm long above, along margin with occasional hairs 1 mm long, beneath with scattered hairs 1.5 mm long, hairs to dense along midrib, 3.0 mm long, as a whole pubescence to scattered, without stellate down above, such down dense beneath (leaves grayish-green); cauline leaves 1 (coefficient of leafiness 0.04), lingulate-lanceolate, small. Inflorescence more or less shallowly dichotomous, with 3–6 capitula; accladium 10–70 mm long; peduncles to scatteredly hairy with dark hairs, to densely fine-glandular, gray-tomentose; floral bracts whitish. Involucres 10–11 mm long, cylindrical; involucre bracts narrow, extended into violet cusp, dorsally blackish-green, with greenish or whitish border and sparse (45) gray hairs 2 mm long with black base, with sparse (32) glands 0.4 mm long, moderately stellate-pubescent (margins glabrous). Corollas light yellow, without red stripes, or with slightly reddish teeth; stigmas dull, later turning black. Flowering June to July.

Wet, turfey meadows.—*European Part*: Dvina-Pechora (southwestern part). Endemic. Described from shores of Lake Kubin. Type in Helsinki; paratype in Leningrad.

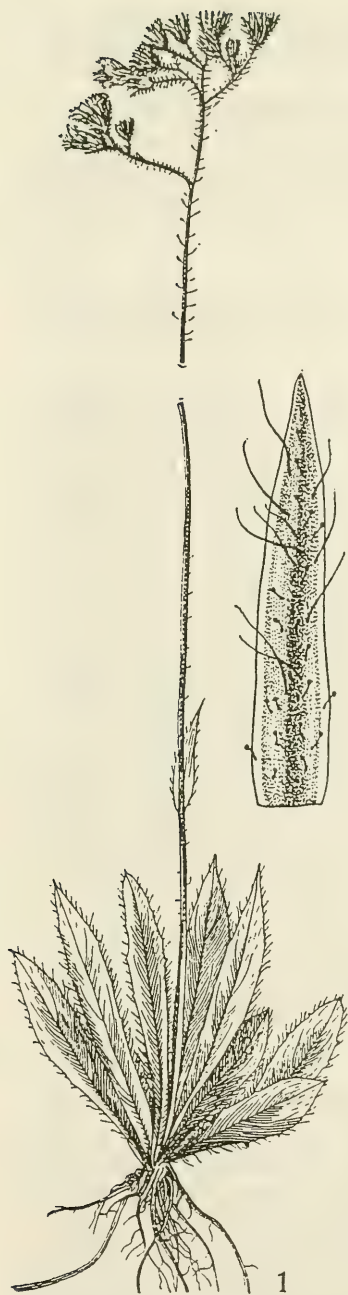
- 640 728. **H. chrysophthalmum** Norrl. Nya nord. Hier. I (1904) 30; Zahn in Pflzr. IV, 280, 1280.—**Exs.:** Norrl. Hier. exs. fasc. III, No. 65.

Perennial. Stem 15–20 cm high, 1.5 mm in diameter, ascending, in lower part with sparse hairs 4 mm long, above with occasional hairs 2.5 mm long, very dense glands above, 0.4 mm long, densely stellate-pubescent; stolons often abortive. Basal leaves (7), oblong-lingulate to lanceolate, to 7 cm long (6.5:1), glaucescent-green, entire, with bristles 3 mm long above, 1.5 mm long beneath and along margin, as a whole sparsely setose, without stellate down above, hyaline-tomentose beneath (leaves grayish from hairs); cauline leaves 0(–1), at very base. Inflorescence shallowly dichotomous to very openly paniculate, with 2–3 capitula; acladium 10–100 mm long; peduncles with occasional hairs, very densely glandular, gray-tomentose. Involucres 9.5–10.0 mm long, with rounded base or subglobose; involucre bracts narrow, subulate, extended into long, pale violet cusp, dull-reddish, with pale border, with scattered, 42(40–45), gray hairs 1.5–2.0 mm long, with scattered, 30(27–33), glands 0.5 mm long, densely stellate-pubescent. Corollas light golden yellow, peripheral ones with dark purple stripes on outside; stigmas yellow or dull. Flowering June to July.

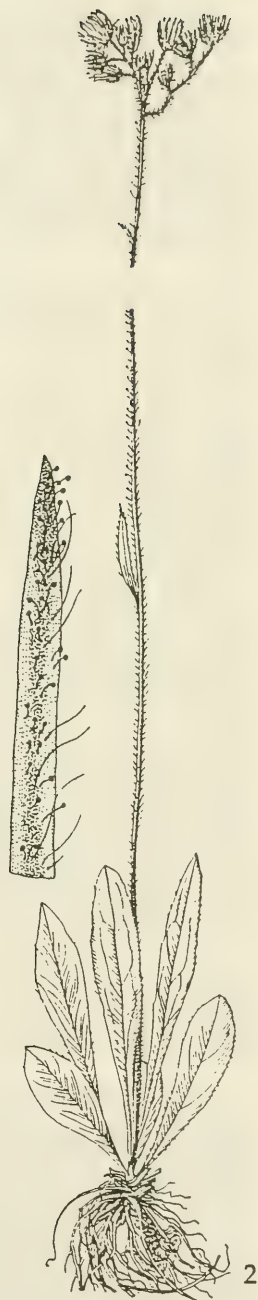
Dry glades.—*European Part:* Dvina-Pechora (southern part). Endemic. Described from banks of Sukhona River. Type in Helsinki; paratype in Leningrad.

729. **H. inceptans** Norrl. Nya nord. Hier. I (1904) 29; Zahn in Pflzr. IV, 280, 1282.—**Exs.:** Norrl. Hier. exs. fasc. III, No. 64.

Perennial. Stem 15–25 cm high, 1.5 mm in diameter, ascending, colored, to scattered-pubescent with bristles 1.5–2.5 mm long (crowded mainly at base), above with sparse glands thinning down toward base, rather densely stellate-pubescent; stolons to 6 cm long, densely pubescent, with 4 spatulate leaves. Basal leaves 6–7, spatulate-lingulate to lanceolate, obtuse to acute, entire, to 7 cm long (4.0–5.5:1), grassy-glaucous-green, with sparse hairs 2–3 mm long above and along margin, moderately hairy beneath and along midrib with hairs 1.5 mm long, as a whole to scatteredly pubescent, with stellate pubescence only beneath, hyaline-tomentose (leaves gray-green); cauline leaves 0–1 (coefficient of leafiness 0.02). Inflorescence dichotomous, with 2–3 capitula; acladium 20 mm long; peduncles with occasional dark hairs 2 mm long, very densely glandular, gray-tomentose. Involucres 9–10 mm long, ovate; involucre bracts somewhat narrow, extended into rather long violet cusp, with indistinct border, with moderate (50) dark
643 hairs 1.5–2.5 mm long, and scattered (35) glands 0.4 mm long, moderately stellate-pubescent. Corollas light yellow, teeth of peripheral florets indistinctly purple; stigmas dull yellow. Flowering June to July.



1



2

Sands.—*European Part*: Dvina-Pechora (southwestern part). Endemic? Described from banks of Sukhona River. Type in Helsinki; paratype in Leningrad.

Note. In his monograph, Zahn refers this species to the group of species in which the involuclral bracts lack or have scattered hairs, which does not conform to reality, because on Norrlin's exsiccatae the hairs on the involuclral bracts are very obvious, and in our estimation the bracts are "moderately pubescent."

730. **H. tatrense** N.P. Hier. Mitteleur. I (1885) 383; Zahn in Pflzr. IV, 280, 1281; Asch. and Graebn. Synopsis, XII, I, 181.—**Exs.**: Hier. Naeg. No. 270.

Perennial. Stem 15–40 cm high, 1.5–2.0 mm in diameter, ascending, at base to moderately pubescent with light-colored bristles 2.5–4.0 mm long, thinning upward, moderately glandular above and densely stellate-pubescent; stolons very elongated, thin. Basal leaves spatulate, rounded-obtuse to lanceolate and acute, glaucescent, with sparse, bristles 2–3 mm long above toward margin, with scattered bristles 1.0–1.5 mm long beneath and along margin, as a whole scatteredly pubescent, to densely stellate-pubescent only beneath; cauline leaves 0–1 (coefficient of leafiness 0.01). Inflorescence deeply dichotomous, with (1–)2–3 capitula; acladium 40–50% as long as stem; peduncles sparsely pubescent, densely glandular, gray-tomentose; floral bracts dark. Involucres 8–9(–10.5) mm long, ovate, later subglobose; involuclral bracts somewhat broad, acute, dark, with narrow, light border, with scattered dark hairs 1.0–1.5 mm long (var. *pilosum* N.P.) or inconspicuously pubescent (var. *calvum* N.P.), scatteredly glandular, scatteredly stellate-pubescent, occasional along margin. Corollas yellow; ligules reddish on outside or concolored. Flowering June to July.

Mountain valleys, ascending in mountains to elfin forests (Chorna Mountain, to 2,000 m).—*European Part*: Upper Dniester. *General distribution*: Central Europe (eastern part). Described from Galicia (Stanislavov). Type in Munich.

731. **H. flagellare** (Willd.) N.P. Hier. Mitteleur. I (1885) 379; Zahn, Hier. fl. Mosquens. 20; Pflzr. IV, 280, 1279; Asch. and Graebn. Synopsis, XII, I, 179, sub *H. eu-flagellare* Zahn.—*H. pilosella* × *polonicum* Blocki ex Wol. in Spraw. Kom. fiz. Akad. Krakow. (1888) 202.—*H. stoloniflorum* Schlechtend. Hall. Fl. Deutschl. ed. 5 (1887) t. 3242.—**Ic.**: van Soest in Nederl. Kruidk. Archief. III (1926) fig. 53.—**Exs.**: Fr. Hier. Europ. No. 2; Hier. Naeg. No. 29; F. Schultz, Herb. norm. n. s. Nos. 90, 91; Callier Nos. 57, 404, 1114, 1238, 1239; Baenitz. Herb. Europ. Nos. 373, 3678, 7909; Zahn, Hier. Europ. Nos. 110, 214, 520, 613.

644 Perennial. Stem 20–30 cm high, 2–3 mm in diameter, sparsely pubescent with light-colored hairs 3–4 mm long, above with scattered glands, thinning downward, scatteredly stellate-pubescent; stolons elongated, thick, often branched or runner-like. Basal leaves 4–7, outer spatulate, oblong, obtuse, inner lanceolate, subacute, green or glaucescent (var. *β. galicicum* N.P.), on both sides sparsely pubescent with soft bristles 3–4 mm long, along margin with scattered hairs 2–3 mm long, moderately to rather densely stellate-pubescent only beneath (leaves grayish-green); cauline leaves 0–1 (coefficient of leafiness 0.02), in rosette. Inflorescence shallowly dichotomous with 2–5 capitula; acladium $1/3$ – $1/2$ as long as stem; peduncles with sparse, soft, light-colored hairs 3–4 mm long, densely glandular, gray from stellate down; floral bracts gray or dark, with light-colored border. Involucres (9–)10–11(–12) mm long, subglobose, later compressed; involucre bracts narrow, acute, dark, with narrow, light border, with sparse to occasional, light or dark hairs 1.5–2.5 mm long, moderately glandular, densely stellate-pubescent (but margins glabrous). Corollas light or dark yellow, peripheral ones with weak reddish stripes on outside or concolored; stigmas yellow. Flowering June to July. (Plate XXXVII, Fig. 2.)

Meadows and forest edges.—*European Part*: Dvina-Pechora (southern part), Baltic Region, Ladoga-Ilmen, Upper Volga, Volga-Don. Upper Dnieper, Upper Dniester. *General distribution*: Scandinavia (southern part), Central Europe, Atlantic Europe (introduced). Described from Silesia. Type may or may not be in Berlin.

Note. Recognition of *H. flagellare* Willd. as a transitional form between *Pratensina* and *Pilosellina* has gained such popularity that the most diverse forms, differing from each other mainly by pubescence, are included under this name. Willdenow's species is distinguished by the number of glands on the involucre bracts, 3–4 times as many as hairs, and is found in our country rather rarely. The systematics of cycle *Flagellaria* deserves special study.

In any case, the specimens examined by us in the exsiccatae in GRF (Nos. 2222, 2223) do not conform to the diagnosis provided by Naegeli and Peter, but they resemble most closely the northern races of this cycle (for example, *H. inceptans* Norrl.).

732. ***H. pseuduliginosum*** Zahn in Pflzr. IV, 280 (1923) 1281; Asch. and Graebn. Synopsis, XII, I, 182.—*H. uliginosum* N.P. Hier. Mitteleur. I (1885) 384; Zahn. Hier. fl. Mosquens. 19, non al.—**Exs.**: Fl. Austro-Hung. Nos. 3024, 3311, sub *H. flagellare* (Willd.) N.P.

Perennial. Stem 15–25 cm high, 1 mm in diameter, sparsely pubescent with light-colored hairs 3–4 mm long in lower part, thinning upward, with scattered to sparse glands above, densely stellate-

645 pubescent; stolons elongated, thin. Basal leaves 3–6, lanceolate, acute, to 11 cm long (4.8:1), green, scatteredly hairy on both sides with hairs 3–4 mm long, sparsely so along margin, with dense stellate down only beneath; cauline leaves 0–1. Inflorescence shallowly or deeply dichotomous, with 2–3 capitula; acladium 30–80% as long as stem; peduncles with occasional hairs, densely glandular, gray-tomentose; floral bracts gray. Involucres 9–10 mm long, ovate, later subglobose; involucre bracts somewhat broad, acute, dark with inconspicuous border, (almost) glabrous, 2(0–8), 1.0–1.5 mm long, to densely, 70(58–80), glandular, glands 0.5–1.0 mm long, densely stellate-pubescent. Corollas yellow, peripheral ones with red stripes on outside or with red teeth. Flowering June to July.

Wet meadows, edges of swamps.—*European Part*: Dvina-Pechora (southern part), Upper Volga. *General distribution*: Central Europe. Described from Bavaria. Type in Munich.

Note. *H. uliginosum* Turcz. ex Froel. DC. *Prodr.* VII (1838) 239 should be referred to *Crepis bungei* Froel.

Cycle 15. Cernuiformia Juxip.—*H. cernuiforme* N.P. Hier. Mitteleur. I (1885) 384, sub *H. flagellari*; Zahn in Pflzr. IV, 280, 1282; Asch. and Graebn. Synopsis, XII, I, 182.—*H. pratense* < *pilosella* (vel. *flagellare-pilosella*) Zahn l. c.—*H. macrostolonum* G. Schneid. Hier. Westsudet. (1889) 45, 115; Rehm. in Verh. zool.-bot. Ges. Wien. XLV, 330.—*Pilosella aurulenta* Norrl. Herb. Pilos. Fenn. II (1894) No. 151.—Inflorescence deeply dichotomous, with (1–)2–3(–4) capitula; acladium long, 70–90% as long as stem; leaves more or less densely stellate-pubescent beneath (inner leaves hyaline-tomentose); involucres in typical forms 10–12 mm long (as an exception, 7–9 mm long); stigmas yellow; stolons often elongated, sturdy, with rather large leaves. With forms analogous to *Piloselliflora* and very difficult to distinguish from it. Rare plants, mostly in association with progenitors.

Note 1. The forms belonging to cycle *Cernuiformia* resemble completely all those of *Piloselliflora*, which represent the hybrids *H. floribundum* < *pilosella* (see page 631). Both of these cycles of intermediate forms were established by Naegeli and Peter (l. c.), based on the hybrids produced by them. As a result, when they described separate species, they had full confidence in the phylogenetic affinity of the components of the species. Later it was revealed that similar forms are also found in nature. If at times it becomes difficult to separate forms of *Pratense* from those of *Floribunda*, then it applies to a great extent to their hybrids with the most polymorphic *Pilosella*, blurring all the differences between *Pratense* and *Floribunda*. Therefore, it is impossible to overestimate the importance of [making] notes

(on the labels) while collecting "cernautian" forms that are growing together with the putative parents. Without doing this, the identification of such hybrids is practically impossible.

Note 2. A number of minor species belonging to this cycle have also been described from Galicia: *H. macrostolonum* G. Schneid., *H. rulkense* Rehm., *H. firmipes* Rehm., *H. chloropoides* Rehm. These species differ from each other mostly in minor details. Because of an almost complete congruence of their substantive characters, we are restricting ourselves here to only mentioning them.

733. **H. cernuiforme** N.P. Hier. Mitteleur. I (1885) 384; Zahn in Pflzr. IV, 280, 1283; Asch. and Graebn. Synopsis, XII, I, 182, sub *H. eucernuiforme* Zahn.—**Exs.:** Hier. Naeg. No. 91; Callier, Fl. Siles. exs. No. 1116; Fl. Austro-Hung. exs. No. 3312; Baenitz, Herb. Europ. No. 6328; GRF Nos. 1272, 1820.

Perennial. Stem 10–35 cm high, 1.5–2.0 mm in diameter, ascending, densely pubescent with dark hairs 4–5 mm long (var. *longipilum* N.P.) or sparsely so with hairs 2–3 mm long (var. *brevipilum* N.P.), moderately to sparsely glandular above, glands decreasing downward, grayish above from stellate down, with scattered down below; stolons elongated, to 15 cm, thin, pubescent, with leaves (to 9) as in *H. pilosella*. Basal leaves 7(2–14), lanceolate, subobtuse, green, to 11 mm[?cm] long (8:1), with occasional bristles 3–5 mm long above, pubescence sparse along margin, scattered beneath, moderate along midrib with hairs 1.5–2.0 mm long, as a whole to scatteredly pubescent, pubescence stellate to hyaline-tomentose only beneath; cauline leaves 0–1 (coefficient of leafiness 0.02), lanceolate (3:1). Inflorescence deeply dichotomous, with 1–2(–3) capitula; acladium 90% as long as stem; peduncles sparsely pubescent, moderately glandular, gray-tomentose; floral bracts dark. Involucres (9–)10–12 or 8 mm long (f. *minoriceps* Zahn), subglobose, later compressed; involucral bracts narrow, very acute, black, with indistinct border, densely (var. *longipilum* N.P.) to sparsely (var. *brevipilum* N.P.), 50 (25–90), hairy with black hairs 2–3 mm long, with scattered, 30(15–60), glands 0.5–0.7 mm long, grayish up to and including margin from stellate down. Corollas yellow, peripheral ones mostly with bright red stripes; stigmas yellow. Flowering June to July.

Meadows and forest edges, rare, mostly occurring together with parents.—*European Part:* Dvina-Pechora (southern part), Ladoga-Ilmen (southern part), Upper Volga, Upper Dnieper. *General distribution:* Central Europe (eastern part). Described from Bavaria. Type in Munich.

Note. It is linked by transitional forms with *H. flagellare* Willd., hence identification errors are very common; it is confused with *H. flagellare*, *H. piloselliflorum* and *H. apatelium*.

Probably, *H. pseudoflagellare* (Blocki) Zahn (Pflzr. l. c.), described from the vicinity of Lvov, should be included in this species.

734. **H. aurosulum** Norrl. Nya nord. Hier. I (1904) 29; Mela-Cajander, Suom. Kasvio, 633; Zahn in Pflzr. IV, 280, 1283.—*Pilosella aurulenta* Norrl. Pilos. bor. (1895) 30, non iord. ex Bor.—**Exs.:** Herb. Pilos. Fenn. fasc. II, No. 151, sub *Pilos. aurulenta* fasc. V, No. 13; Lindberg, Pl. Finnl. exs. No. 1587.

- 647 Perennial. Stem 15–30 cm high, 1.5–2.0 mm in diameter, moderately pubescent at base with white, downward-directed hairs, thinning upward, but to moderately spreading-pubescent again below capitula; as a whole densely pubescent, densely or to very densely glandular above, rather densely stellate-pubescent; stolons elongated, thin, pubescent and tomentose, to 13 cm long, with remote small leaves (5–8) as in *H. pilosella*, sometimes with rudimentary inflorescence at tip. Basal leaves 4–7, from somewhat spatulate and obtuse to lanceolate and short-acuminate (to narrowly lanceolate), entire or distinctly finely toothed, dark green, with sparse bristles 3 mm long above, with scattered hairs 1.5 mm long along margin, moderately to densely hairy beneath and along midrib with hairs 2 mm long, as a whole moderately pubescent, stellate pubescence dense only beneath, hence leaves grayish-green; cauline leaves 0–1 (coefficient of leafiness 0.02), lanceolate, small, often bracteiform. Inflorescence deeply dichotomous, with (1–)2 capitula; acladium, on average, 4/5 as long as stem; peduncles moderately pubescent, densely glandular, gray-tomentose. Involucres 9–10 mm long; involucral bracts narrow, subacute, green, bordered, with colored tip, with scattered, 32(17–50), light-colored hairs 1.5 mm long, with moderate, 52(36–67), glands 0.5 mm long, moderately stellate-pubescent. Corollas light golden yellow, later saffron-colored, peripheral ones with bright red stripes on outside; stigmas yellow. Flowering June to July. (Plate XL, Fig. 2.)

Herb slopes and mixed meadows, along canals.—*European Part:* Ladoga-Ilmen (northern part). *General distribution:* Scandinavia (Finland). Described from Lake Ladoga Region in Karelia. Type in Helsinki; paratype in Leningrad.

735. **H. moscoviticum** Peter in Nachr. K. Ges. Wiss. Götting. 2 (1893) 73; Zahn, Hier. fl. Mosquens. 19; Pflzr. IV, 280, 1283.—**Exs.:** GRF No. 2224a, b.

Perennial. Stem 10–28 cm high, sparsely pubescent with light-colored hairs, densely glandular above, quite stellate-pubescent; stolons as in *H. cernuiforme* N.P. Basal leaves 4–10, narrowly lanceolate, more or less acute, to 8 cm long (5:1), glaucescent, scatteredly

pubescent with soft hairs 2–3(–4) mm long, without stellate down above, to hyaline-tomentose beneath; cauline leaves 0(–1). Inflorescence deeply dichotomous, with 2 capitula; peduncles sparsely pubescent; densely glandular, gray-tomentose. Involucres (8.5–)9–10 mm long, ovate; involucre bracts narrow, very acute, blackish, with narrow green border, with scattered to sparse, 23(18–35), hairs 1.0–1.5 mm long, with scattered, 30(23–42), glands 0.4 mm long, scatteredly stellate-pubescent beneath. Corollas yellow, concolored, and only teeth of peripheral florets reddish. Flowering June to July.

Meadows and old fields.—*European Part*: Dvina-Pechora (southern part), Upper Volga. Endemic? Described from Moscow Region. Type in Leningrad.

648 736. **H. amoeniceps** Zahn in Sched. HFR VII (1911) 96; exs. No. 2225; Pflzr. IV, 280, 1284.—**Exs.**: GRF No. 2225.

Perennial. Stem 15–25 cm high, 1.0–1.5 mm in diameter, moderately pubescent with white hairs 2–3 mm long, scatteredly glandular above (glands thinning toward base of stem), densely stellate-pubescent, often with collateral stems and runner-like stolons, densely pubescent, with long, narrow leaves. Basal leaves 5–10, narrowly to linear-lanceolate, long, subacute to acute, to 8 cm long (7.5:1), with sparse hairs 2.0–3.5 mm long above, to scattered toward base, without stellate down above, densely pubescent beneath (leaves grayish-green); cauline leaves 1 (coefficient of leafiness 0.04), small. Inflorescence deeply dichotomous, with 1–2 capitula; peduncles with sparse, short, white hairs, densely glandular, gray-tomentose. Involucres 8–9 mm long, ovate, later subglobose, compressed; involucre bracts narrow, acute, dark, with narrow green border, with sparse, 14(16–23), hairs 1.5 mm long and with dense, 87(80–95), glands 0.5 mm long, scattered stellate-pubescent. Corollas yellow, with sparse or with conspicuous red stripes. Flowering June to July.

Old fields.—*European Part*: Dvina-Pechora. Endemic. Described from Syktyvkar (former Ust-Sysolsk). Type in Leningrad.

Cycle 16. Piloselliflora Juxip.—*H. piloselliflorum* N.P. Hier. Mitteleur. I (1885) 702, 707; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1092; Zahn, Hier. fl. Mosquens 48; Pflzr. IV, 280, 1302; Asch. and Graebn. Synopsis, XII, I, 201.—*H. floribundum* < *pilosella* Zahn, l. c.—Inflorescence deeply dichotomous, with (1–)2–3(–4) capitula; acladium long, 70–90% of stem length, leaves more or less densely stellate-pubescent beneath (inner leaves hyaline-tomentose); involucre in typical forms 10–12 mm long (in exceptional cases 7–9 mm

long); stigmas yellow (dull yellow to darkened); stolons often long, sturdy, with large leaves.

An evolution analog of *Cernuiformia*, hence quite difficult to distinguish from it. Rare plants, mostly in association with their progenitors. For details about *Piloselliflora*, see page 628).

737. **H. piloselliflorum** N.P. Hier. Mitteleur. I (1885) 708; Zahn, Hier. fl. Mosquens. 49; Pflzr. IV, 280, 1302; Asch. and Graebn. Synopsis, XII, I, 201, sub *H. eu-piloselliflorum* Zahn.—Exs.: Hier. Naeg. No. 111; Baenitz, Herb. Europ. No. 6655; Zahn, Hier. Europ. Nos. 137, 434, 710, GRF No. 1285–1287.

Perennial. Stem 10–35 cm high, 1.5–3.0 mm in diameter, more or less ascending, with sparse, light-colored hairs 2–4 mm long below, thinning upward, with dark hairs above, densely glandular, conspicuously stellate-pubescent; stolons elongated (to 35 cm), somewhat thick, with 4–8 leaves. Basal leaves 6–17, outer usually obovate, others oblong to
649 lanceolate, obtuse to subacute, light glaucous, to 7 cm long (6:1), sparsely pubescent with hairs 2–4 mm long, without stellate down above, rather densely stellate to hyaline-tomentose beneath; cauline leaves 1 (coefficient of leafiness 0.04), in rosette, lanceolate. Inflorescence deeply dichotomous, with (1–)2(–4) capitula; acladium 2/3 as long as stem; peduncles very sparsely pubescent, densely glandular, gray-tomentose; floral bracts light-colored. Involucres 10–12 mm long, subglobose, later compressed; involucral bracts broad, acute, black, with green border, with dense (10 [sic.]), black hairs 1.5–2.0 mm long, (f. *hirsuticeps* N.P.) or with very sparse (10) hairs (to almost glabrous) (f. *glandulosiceps* N.P.), with moderate to dense (40–80) glands 0.6 mm long, densely stellate-pubescent. Corollas yellow, peripheral ones almost always with red stripes on outside; stigmas yellow. Flowering June to July.

Grassy places, meadows and forest edges.—*European Part*: Dvina-Pechora (southeastern part), Baltic Region, Ladoga-Ilmen, Upper Volga, Volga-Don. *General distribution*: Central Europe (eastern part). Described from the Sudeten. Type in Munich.

Note. *H. melanopsiforme* Zahn, GRF (No. 1285) cum descriptione, should also be included here! Type in Leningrad.

738. **H. microsphaericum** Zahn, Hier. Europ. (1911) No. 546; Pflzr. IV, 280, 1303.—Exs.: Zahn, Hier. Europ. No. 546.

Perennial. Stem 10–20 cm high, 1 mm in diameter, at base densely and upwards to moderately pubescent, scatteredly short-glandular above, conspicuously stellate-pubescent; stolons elongated, thin, conspicuously pubescent, with remote leaves. Basal leaves to 5, more or

less broadly lanceolate, obtuse to acute, long, very sparsely setose above, moderately so along margin and beneath (especially toward base) without stellate down above, moderately to densely pubescent beneath; cauline leaves 0–1 (coefficient of leafiness 0.02), small, narrow. Inflorescence deeply dichotomous, with 2–3 capitula; acladium 50–200 mm long (one-fourth to as long as stem); peduncles sparsely pubescent, moderately to densely glandular with long glands, gray-tomentose. Involucres 7.0–8.5 mm long ovate; involucre bracts narrow, subacute, dark, with light border, with scattered, 38–48, hairs 2 mm long, and sparse, 22–25, glands 0.5 mm long, grayish from stellate down. Corollas yellow; ligules short; stigmas dark. Flowering June to July.

Dry grassy places.—*European Part*: Baltic Region (southern part), Upper Dnieper. Endemic. Described from vicinity of Tilsit [Sovetsk]. Type unknown.

739. *H. stenozon* Zahn in Pflzr. IV, 280 (1923) 1303.—*H. stenophyton* Zahn in Sched. HFR VII (1911) 101; Sched. Hier. Europ. p. 13.—**Exs.**: Zahn, Hier. Europ. Nos. 545, 2238a, b.

650 Perennial. Stem 15–20 cm high, moderately pubescent with light-colored hairs 1–3 mm long, with sparse glands down to base, gray-tomentose, often with collateral stems or runners; stolons elongated, densely white-pubescent, with rather long, narrowly lanceolate leaves. Basal leaves 5–6, oblong, narrowly to linear-lanceolate, acute, to 6 cm long (6.3:1), green, moderately above, densely pubescent beneath and along margin with hairs 1–3 mm long, without stellate down above, more or less densely downy beneath (hyaline-tomentose on inner, narrower leaves); cauline leaves 0–1 (coefficient of leafiness 0.02), small. Inflorescence deeply dichotomous, with (1–)2(–3) capitula; acladium 100–200 mm long (half as long as stem); peduncles with sparse, light-colored hairs 0.5–1.0 mm long, moderately glandular, gray-tomentose. Involucres 8–9 mm long, ovate, later compressed; involucre bracts narrow, acute, dark, with wide, green border, with very sparse, 12(5–20), light-colored hairs 1 mm long, with moderate to dense, 75(45–90), glands 0.5 mm long, scatteredly stellate-pubescent. Corollas yellow or peripheral ones with red tips; stigmas yellow. Flowering June to July.

Meadows and dry sandy places.—*European Part*: Dvina-Pechora. Endemic. Described from Syktyvkar (former Ust-Sysolsk). Type in Leningrad.

Note. An evolutionary analogue of *H. amoeneiceps* Zahn.

Cycle 17. Levieria Juxip.—*H. levieri* Peter in Nachr. K. Ges. Wiss. Götting. I (1898) 18; Zahn in Pflzr. IV, 280, 1303; Grossh. Fl. Kavk. IV, 275.—*H. longiscapum* > *Hoppeanum* Peter, l. c.—*H. collinum-Auricula-Hoppeanum* Peter, l. c.—*H. longiscapum* > *Hoppeanum (macranthum)* Zahn in Pflzr. l. c.—In habit, resembles *H. flagellare* Willd. but differs by having darker stigmas, more or less wide involucre bracts and short stolons with rather large leaves; involucre 8–11 mm long. Endemics of Caucasus-Asia Minor.

740. *H. levieri* Peter in Nachr. K. Ges. Wiss. Götting. I (1898) 18; Zahn in Pflzr. IV, 280, 1303.

Perennial. Stem 10–25 cm high, 1.5 mm in diameter, densely pubescent with spreading, light-colored bristles 2–4(5) mm long having black base, sparsely glandular, conspicuously stellate-pubescent; stolons short and underground or somewhat elongated and above-ground, with conspicuous leaves. Basal leaves (–8) elliptical, oblong-lanceolate or somewhat spatulate, acute, to 3 cm long, broad (3:1), finely toothed, green, on both sides moderately soft-bristly, bristles 4–5 mm long (less hairy above) without stellate down above, such hairs scattered to dense above; cauline leaves 1 (coefficient of leafiness 0.06). Inflorescence deeply dichotomous with (1–)2–3 capitula; acladium 10–30(–160) mm long; peduncles conspicuously pubescent, moderately to scatteredly
651 (downward) glandular, gray-tomentose. Involucre 8–9(–10) mm long, ovate, with truncate base; involucre bracts wide, subacute, spinescent, dark, with very wide, green border, with scattered to sparse, 26(20–30), light-colored hairs 2 mm long, and sparse, 17(12–22), glands 0.5–0.8 mm long, moderately stellate-pubescent. Corollas yellow; peripheral ones reddish at tips; stigmas dark. Flowering July to August.

Mountains in alpine zone, at 1,700–2,400 m.—*Caucasus*: Western Transcaucasia. *General distribution*: Balkans-Asia Minor (eastern part). Described from Svanetia. Type in Florence; cotype in Leningrad.

Note. Evidently, we should include here *H. mestianum* Zahn (*Vestn. Tifl. Bot. Sada*, 21, 1912, 2; *Pflzr.* IV, 280, 1304), which differs from *H. levieri* Peter virtually only by having concolored florets and somewhat larger, thick involucre (9–10 mm long); also described from Svanetia. Type unknown.

In stunted specimens, the stolons may be absent, and the inflorescence can be single-headed as well, which makes identification extremely difficult.

741. *H. abakurae* Schelk. and Zahn in Izv. Kavk. Muzeya, VII (1912) 130; *Pflzr.* IV, 280, 1304; Grossh. Fl. Kavk. IV, 275.—*H. levieri-pilosella* Zahn l. c.

Perennial. Stem 12–30 cm high, to densely pubescent with spreading, soft bristles 2.5–5.0 mm long, above densely, below to sparsely glandular, densely stellate-pubescent; stolons elongated, somewhat thick, gray-tomentose, densely white-pubescent, with remote, rather large leaves, becoming smaller toward top. Basal leaves (4), outer oblong, obtuse, often violet, others oblong-lanceolate, subacute, to 10 cm long (5–6:1), light green, glaucescent, to moderately pubescent above with bristles 3–5 mm long, without stellate down above, densely pubescent beneath (on young leaves to tomentosely so); cauline leaves 0–1 (coefficient of leafiness 0.03), small. Inflorescence deeply dichotomous, with 1–2(–3) capitula; acladium 2/3 as long to as long as stem; peduncles densely pubescent, densely glandular, gray-tomentose. Involucres 10–11(–12.5) mm long, ovate, wide; involucre bracts broadly lanceolate, acuminate, dark green, with wide green border, with reddish tips, with moderate, 60(45–70), light-colored hairs to 2 mm long, with dark base, sparsely, 12(8–15), glandular, glands 0.6 mm long, sparsely stellate-pubescent only beneath [along midrib]. Corollas yellow, peripheral ones with red stripes on outside; stigmas yellow. Flowering July.

Mixed montane forests, at 1,200–2,100 m.—*Caucasus*: Western Transcaucasia. Endemic. Described from Svanetia (Abakur Pass). Type in Tbilisi.

Note. Apparently, *H. hemschinense* (Zahn, *Pflzr.* IV, 280, 1304), described from the Caucasus (?), and considered by Zahn as *H. longiscapum* < *Hoppeanum* Zahn, belongs here. This species is not represented in the Herbarium of the Botanical Institute of the Academy of Sciences of the USSR; A.A. Grossheim also does not report it for the Caucasus. The type is unknown.

Subsection 3. Aurantiaca Juxip.—*H. aurantiacum* L. ex Zahn in *Pflzr.* IV, 280 (1923) 1241; Asch. and Graebn. Synopsis, XII, I, 133.—Characters in key to subsections of section *Pratensina*.

It differs from subsection *Pratenses* virtually by the color of florets (red to orange).

1. Stellate pubescence on lower surface of leaves and involucre bracts very sparse to (almost) absent.....2.
- + Stellate pubescence on lower side of leaves distinct (moderate); florets orange; plants from North.....750. **H. kihlmanii** Norrl.
2. Leaves densely (very densely to moderately) pubescent, light green.....3.
- + Leaves mostly (very) sparsely pubescent or almost glabrous, glaucescent.....10.

3. All corollas uniformly purple; stigmas dark (native in USSR, only in Carpathian Mountains, introduced in other regions)742. **H. aurantiacum** L.
- + Inner corollas more or less orange, peripheral ones purple, at least on outside; plants from the North.....4.
4. Stigmas dark.....5.
- + Stigmas rusty-red or yellowish.....9.
5. Hairs on involucre bracts equal to or outnumbering glands.....6.
- + Glands on involucre bracts significantly outnumbering hairs (roughly in ratio of 2:1); involucre rather large, 8.5–9.0 mm long.....747. **H. concoloriforme** Norrl.
6. Hairs and glands on involucre bracts in ratio of 2:1.....7.
- + Hairs and glands on involucre bracts equal in number (1:1); involucre 7.0–8.5 mm long.....8.
7. Involucre 7–8 mm long; glands in inflorescence rather large (0.5 mm long).....743. **H. tjapomense** Norrl.
- + Involucre 6.5–7.0 mm long; glands in inflorescence small (0.3 mm long).....744. **H. lychnaeum** Norrl.
8. Leaves densely short-pubescent with hairs 0.6–0.8 mm long.....745. **H. kajanense** Malmgr.
- + Leaves moderately pubescent with hairs 1.0–1.5 mm long.....746. **H. calolepideum** Norrl.
- 9 (4). Hairs and glands on involucre bracts almost equal in number (1:1).....748. **H. rubroonegense** Norrl.
- + Hairs and glands on involucre bracts in ratio of 4:1.....749. **H. semionegense** Norrl.
- 653 10 (2). Glands on involucre bracts sparse (10–20).....11.
- + Glands on involucre bracts scattered (30–45); leaves glaucescent; stem very densely pubescent.....751. **H. aeruginascens** Norrl.
11. Peduncles (almost) glabrous.....12.
- + Peduncles with occasional hairs; hairs and glands on involucre bracts more or less equal in number; involucre bracts subobtusate.....752. **H. discoloratum** Norrl.
12. Glands on peduncles scattered; hairs and glands on involucre bracts in ratio of 2:3; involucre bracts subacute.....753. **H. pseudo-blyttii** Norrl.
- + Glands on peduncles moderate to very dense.....13.
13. Glands on peduncles moderate; stem in upper part very densely fine-glandular; involucre bracts subobtusate; hairs and glands on involucre bracts in ratio of 3:7.....754. **H. vernicosum** Norrl.
- + Glands on peduncles dense or very dense.....14.

14. Glands on peduncles dense; involucre bracts obtuse; leaves sparsely pubescent; hairs and glands on involucre bracts more or less equal in number.....755. **H. pulvinatum** Norrl.
 + Glands on peduncles very dense; involucre bracts acute; leaves moderately pubescent; hairs and glands on involucre bracts in ratio of 1:2; [corolla] teeth of peripheral florets deeply incised, curling on drying.....756. **H. torquescens** Norrl.

Cycle 1. Aurantiaca.—*Grex H. aurantiacum* Zahn in Pflzr. IV, 280 (1923) 1241.—*H. eu-auranticum* Zahn in Asch. and Graebn. Synopsis, XII, I, 134.—All corollas uniformly purple. In USSR native only in Upper Dniester Region (Carpathian Mountains); only introduced in all other regions.

742. **H. aurantiacum** L. Sp. pl. (1753) 801, (1763) 1126; Jacq. Fl. Austr. V, 410; Vill. Hist. pl. Dauph. III, 102; Ldb. Fl. Ross. II, 851; Fr. Symb. 23; Epicr. 24; N.P. Hier. Mitteleur. I, 288; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1076; Zahn in Pflzr. IV, 280, 1241; Hegi, Ill. Fl. VI, 2, 1211; Asch. and Graebn. Synopsis, XII, I, 133; Dahlst. in Lindm. Svensk. Fan.-Fl. 2 ed. 595; Omang, Hier. Norv. I, 62 non All., nec Fiek. nec Lap.—**lc.**: Rchb. Ic. XIX, 58, t. 113, f. II.—**Exs.**: Fr. Hier. Europ. Nos. 17, 20; Hier. Naeg. Nos. 17, 80. 122; Zahn, Hier. Europ. Nos. 312, 416, 417, 513a.

654 Perennial. Stem 20–60 cm high, 1.5–3.0 mm in diameter, easily compressed, very densely pubescent at base with downward-directed, light-colored, soft bristles 4 mm long with black base, hairs less frequent in middle, but dense above again, spreading, dark, moderately glandular above, glands gradually thinning downward, only in upper part densely stellate-pubescent; stolons underground, thin, pale, with pale scales and above-ground, thin, with rather large, equal-sized leaves, often clustered into rooting leaf rosette, like basal leaves (stolons very brittle). Basal leaves 4(2–6), rather large, to 17 cm (6–7:1), oblong-spatulate or lingulate to lanceolate, obtuse to acute, mostly entire, pure green, soft, with scattered hairs above 1.2–2.0 mm long, dense beneath and along margin, 1.5–2.5 mm long, as a whole densely hairy; with sparse stellate down only beneath and that mainly along midrib; cauline leaves 1–4 (coefficient of leafiness 0.06), lanceolate, acute (4–5:1), pubescence as on basal leaves, with occasional small glands along margin. Inflorescence paniculate-umbellate, initially compact, later more open, with 2–12(–25) capitula; acladium 3–8 mm long (rarely longer); peduncles with occasional hairs, densely glandular, gray-tomentose; floral bracts dark. Involucre (6–)7–8(–9) mm long, ovate, involucre bracts somewhat broad to narrow, subobtuse to acute, dark,

sometimes with light border, with sparse (to scattered), 17(50–30), dark hairs 2.5–3.0 mm long and scattered, 18(15–30), glands 0.4–0.5 mm long, sparsely stellate-pubescent. Florets purple (in dry condition color of clot- ted blood or lilac); stigmas dark. Flowering June to July (August).

Mountain meadows and pastures ascending to 2,600 m but also descending into valleys; occurring wild in Carpathian Mountains, introduced in other regions.—*European Part*: Baltic Region (introduced), Ladoga-Ilmen, Upper Dnieper, Upper Dniester (Carpathian Mountains and their spurs); *Western Siberia*: Altai; *Far East*: Sakhalin. *General distribution*: Scandinavia, Central Europe (especially the Sudeten and Carpathian Mountains), Japan, North America. Described from Central Europe? Type unknown.

Economic Importance: Often cultivated as an unpretentious orna- mental plant, it is quite attractive because of its red flowers and the pleasant green color of its leaves. It spreads easily from gardens, parks, and cemeteries, which explains the occurrence of this mountain plant in many regions farther east.

On the distribution map of this species, Zahn (*Pflzr.*, p. 1240) connected the ranges of the two related species which replace each other, viz., the northern *H. crocea* and the Central European *H. aurantiaca*, with the connecting corridor passing through the western regions of the Soviet Union (Baltic Region, Upper Dnieper). This con- fusion has arisen, apparently, because in the literature there is no mention that *H. aurantiacum* L. is found here exclusively as an intro- duced plant.

Cycle 2. Crocea Juxip.—Grex *H. croceum* Zahn in *Pflzr.* IV, 280 (1923) 1245.—*H. aurantiacum* B., *H. croceum* Zahn in Asch. and Graebn.
655 Synopsis, XII, I, 138.—Florets yellowish orange, only peripheral florets with purple or bright red stripes on outside. All other characters agree with those of *Aurantiaca*. Stolons mostly underground. Plants of the subarctic zone of the European territory of the Soviet Union.

743. *H. tjamomense* Norrl. Nya nord. Hier. I (1904) 55; Mela-Cajander, 647; Zahn in *Pflzr.* IV, 280, 1246.—*Pilosella kajanensis* var. 2. Norrl. Anteckn. öfv. Pilos. Fenn. I (1884) 120.—**Exs.**: Norrl. Hier. exs. fasc. III, No. 113.

Perennial. Stem 20–30 cm high, 1–2 mm in diameter, very densely pubescent below with hairs 1.5–2.5 mm long, above hairs dark, 2–3 mm long, scatteredly glandular and also scatteredly stellate-pubescent above; stolons underground developing rosettes at their ends. Basal leaves oblong to broadly or narrowly lanceolate, few (1–2), with fine (spiniform) teeth, pure green, on both sides and as a whole densely

pubescent, without stellate hairs; cauline leaves 1–2 (coefficient of leafiness 0.06), bottom leaf rather large, oblong-spatulate or lanceolate, short-acuminate, with sparse stellate down beneath, upper leaf rudimentary. Inflorescence paniculate, with 3–10 capitula; acladium 6 mm long; peduncles with occasional hairs and sparse, rather large glands, gray-tomentose. Involucres 7–8 mm long, cylindrical; involucral bracts somewhat broad, obtuse, with wide white border and violet tips, with sparse (20), dark hairs 2.5 mm long and occasional, 14(8–18), glands 0.5 mm long, sparsely stellate-pubescent. Corollas dark yellow to orange, peripheral ones red on outside; stigmas dark yellow, later turning dark. Flowering August.

Wet turfy meadows.—*European Part*: Karelia-Lapland. Endemic. Described from vicinity of Varzuga (Tyapoma River, Murmansk Region). Type in Helsinki.

744. **H. lychnaeum** Norrl. Pilos. bor. (1895) 52; Zahn in Pflzr. IV, 280, 1256.—*Pilosella lychnaea* Norrl. Pilos. bor. (l. c.).—**Exs.**: Norrl. Hier. exs. fasc. II, No. 61.

Perennial. Stem 40–50 cm high, 1.5–2.0 mm in diameter, reddish at base, to densely pubescent in lower part with whitish, thin hairs 1.0–1.5 mm long, hairs above somewhat dark, 1.5–2.0 mm long, scatteredly glandular and sparsely stellate-pubescent above. Basal leaves few, wide, oblong-lanceolate, acuminate, light green, moderately short-pubescent (to 1 mm) without stellate down above, very sparsely (mainly along midrib) stellate-pubescent beneath, cauline leaves 1–2 (coefficient of leafiness 0.03), bottom leaf [well] developed, lanceolate, acute, densely pubescent beneath, upper leaf rudimentary. Inflorescence openly umbellate, with 4–11 capitula; peduncles with occasional, below capitula to sparse, very fine, darkish hairs 2–3 mm long, moderately glandular with small glands, gray from hairs; floral bracts dark. Involucres 6.5–7.0 mm long; involucral bracts narrow, subobtusate, with pale green border and reddish-purple tip, with scattered, dark hairs 1–2 mm long and sparse small glands, with very sparse stellate down. Corollas golden-reddish with red or colorless teeth. Flowering June to July.

Meadows.—*European Part*: Dvina-Pechora. Endemic. Described from Pizhma District. Type in Helsinki.

745. **H. kajanense** Malmgr. in Not. Fa. et. Fl. Fenn. II, 3 (1861) 19, in nota; Norrl. Anteckn. öfv. Finl. Pilos. I, 116; Nya nord. Hier. I, 58; Mela-Cajander, Suom. Kasvio, 646; Zahn in Pflzr. IV, 280, 1245.—**Exs.**: Norrl. Herb. Pilos. Fenn. I, No. 53; Hier. exs. fasc. III, Nos. 115–118, fasc. VII, No. 2; GRF No. 825 p. p.

Perennial. Stem 25–50 cm high, 1.0–1.5 mm in diameter, violet at base, with very dense, downward-directed, light-colored hairs 2.5 mm long in lower part, hairs sparser in middle, 1.5 mm long, above with dense, spreading, dark hairs 2.5 mm long, to scatteredly glandular above, sparsely stellate-pubescent; stolons as in *H. aurantiacum*. Basal leaves (3), oblong-lanceolate, rounded-obtuse to acute, to 12 cm long (5.0–6.5:1), entire, pure green, densely pubescent above and beneath along midrib, moderately so beneath and along margin, as a whole densely pubescent with short hairs 0.6–0.8 mm long, with very sparse stellate down only beneath along midrib or without such down; cauline leaves 1–3 (coefficient of leafiness 0.05), lanceolate, acute, pubescence as on basal leaves or somewhat denser, with glands beneath along midrib. Inflorescence paniculate-umbellate, with 3–6(–12) capitula; acladium 5–10 mm long; peduncles with sparse, dark hairs 2.5 mm long, moderately glandular with glands 0.4 mm long, gray-tomentose. Involucres 7–8(–8.5) mm long, ovate; involucre bracts narrow, acuminate (to subobtusate), dark, with green border and violet tip, with scattered, 23(20–30), dark hairs 2.5 mm long, with sparse 25(15–30), glands, almost without stellate down. Corollas orange, peripheral ones purple on outside; stigmas dark. Flowering July to August.

Thin wet meadows and slopes.—*European Part*: Karelia-Lapland (southern part), Dvina-Pechora, Ladoga-Ilmen (northern part). *General distribution*: Scandinavia. Described from Finland. Type in Helsinki; paratype in Leningrad.

Note. Probably, the following three species should be included here as synonyms: *H. imponens* Norrl. (*Nya nord. Hier.* I, 1904, 56; *Pflzr.* IV, 280, 1246.—**Exs.**: Norrl. *Hier. exs. fasc.* III, No. 114), described from the Dvina-Pechora Region (rapids of the Onega River); *H. latvense* Norrl. (op. cit. 53; *Pflzr.* I. c.—**Exs.**: Norrl. *Hier. exs. fasc.* III, No. 109), described from the Ladoga-Ilmen (Ladva in Olonets District); and *H. obsistens* Norrl. (op. cit. 57; Mela-Cajander, *Suom. Kasvio*, 1906, 647; *Pflzr.* I. c.), described also from Ladva in the Olonets part of Karelia. All three species differ from *H. kajanense* Malmgr. by having finely toothed leaves and larger (8.5–9.0 mm long) involucres; *H. obsistens* differs by having sparsely pubescent involucre bracts with occasional glands, *H. imponens*—by broad involucre bracts with a wide white border, vigorous growth (50–55 cm tall), and lastly by the leaf pubescence (longer bristles 1.5–2.0 mm). Types are in Helsinki.

746. **H. calolepideum** Norrl. Pilos. bor. (1895) 49; Zahn in *Pflzr.* IV, 280, 1246.—**Exs.**: Norrl. *Hier. exs. fasc.* II, No. 62.

Perennial. Stem 50–70 cm high, 2–3 mm in diameter, violet at base and densely pubescent with thin, white bristles 2.0–2.5 mm long,

thinning upward and sparse and dark above, 3.0–3.5 mm long, moderately glandular above, glands thinning downward, slightly stellate-pubescent; stolons underground, less frequently above-ground. Basal leaves 1–4, oblong to lanceolate, to 14 cm long (5–6:1), entire or very finely toothed, pure green, as a whole to moderately pubescent with hairs 1.0–1.5 mm long, without stellate down; cauline leaves 2–3 (coefficient of leafiness 0.04), lanceolate, acute, almost without stellate down beneath, without such down above. Inflorescence paniculate, with 8–16 capitula; acladium 6–10 mm long; peduncles with occasional hairs, moderately glandular, grayish from hairs; floral bracts whitish. Involucres 7.5–8.0 mm long; involucral bracts narrow, obtuse, with wide white border and pinkish or pale violet tip, with scattered darkish hairs and also scattered fine glands, sparsely (conspicuously at base) stellate-pubescent. Corollas reddish-orange, peripheral ones with red stripes on outside; stigmas dark. Flowering June to July.

Wet meadows in tall grass.—*European Part*: Dvina-Pechora. Endemic. Described from Pizhma District, Novozhilovo on Pechora. Type in Helsinki.

747. **H. concoloriforme** Norrl. Nya nord. Hier. I (1904) 54; Mela-Cajander, Suom. Kasvio, 647; Zahn in Pflzr. IV, 280, 1246.—**Exs.**: Norrl. Hier. exs. fasc. III, No. 110.

Perennial. Stem 15–40 cm high, 1.0–2.5 mm in diameter, moderately pubescent at base, sparsely so on other parts with dark gray bristles 2.5–3.5 mm long, moderately glandular above with glands 0.6 mm long, thinning down to middle of stem and scatteredly stellate-pubescent; stolons underground. Basal leaves 3–5, oblong-spatulate, rounded-obtuse to broadly lanceolate and subacute, to 10 cm long (4–5:1), finely (spinously) toothed, green, moderately pubescent above, scatteredly so along margin, densely beneath, along midrib very densely, as a whole densely pubescent with hairs 1.0–1.5 mm long, without stellate down (or with occasional stellate down beneath along midrib); cauline leaves 1(–2) (coefficient of leafiness 0.07), bottom leaf small, lanceolate, acute, upper narrow, rudimentary, bracteiform. Inflorescence paniculate, with 4–11 capitula; acladium 5 mm long; peduncles with occasional bristles, scatteredly glandular, gray-tomentose. Involucres 8.5–9.0 mm long; involucral bracts somewhat broad, obtuse, 658 with reddish tips, with sparse, 16(13–20), gray hairs 2–3 mm long, scattered, 30(25–35), glands 0.6 mm long, almost without stellate down. Corollas dark yellow to orange, with red teeth, peripheral ones with red stripes on outside; stigmas dark. Flowering June to July.

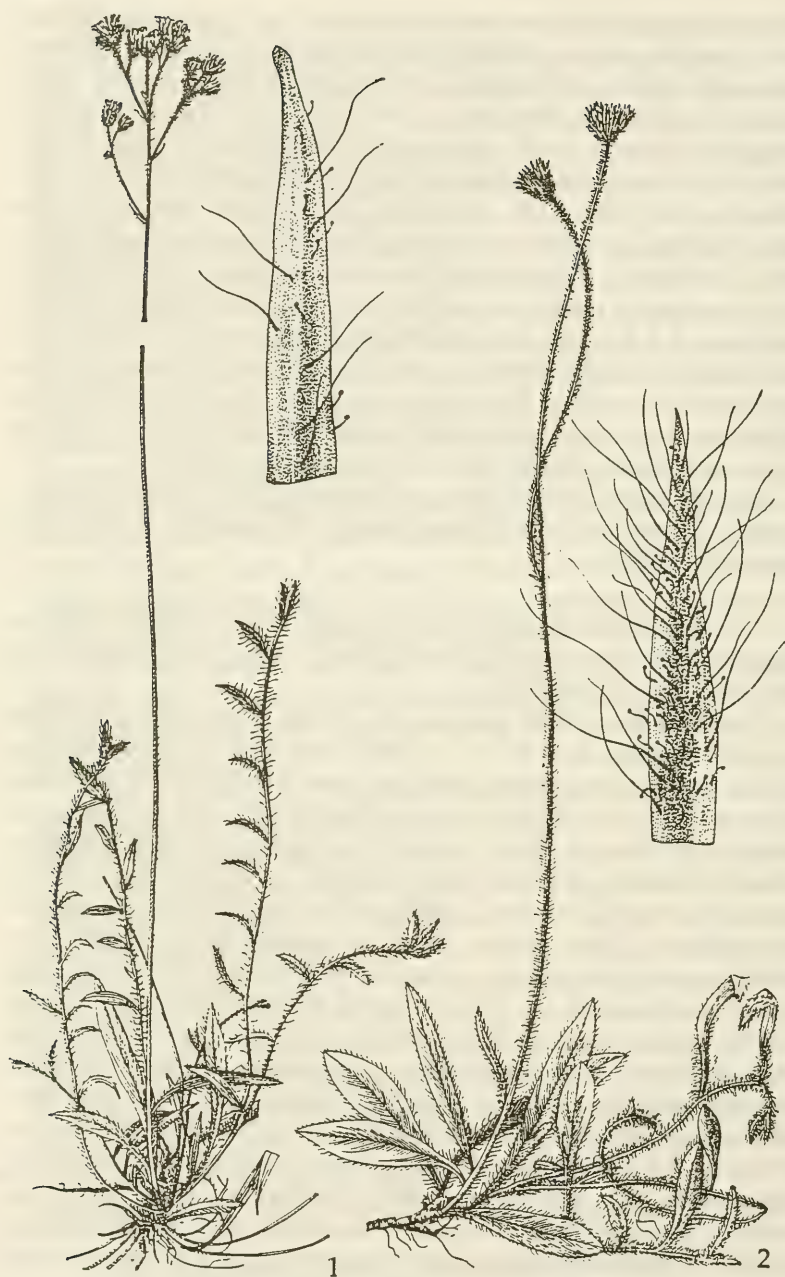


Plate XXXVII.

1—*H. glaucescens* Bess.; 2—*H. flagellare* (Willd.) N.P.

Wet meadows and along ditches.—*European Part*: Ladoga-Ilmen (northern part). Endemic. Described from Ladva (Olonets part of Karelia). Type in Helsinki; paratype in Leningrad.

Note. Despite its inclusion by Zahn (in Engl. l. c.) in the category of concolored species, because of the red-colored teeth and outside of the peripheral florets, this species seemingly belongs to the group of bicolored species; this difference is further accentuated by drying. In this context, it is appropriate to note that the name proposed by the author himself is quite unfortunate.

Cycle 3. Fuscoatra Juxip.—*H. fuscoatrum* N.P. Hier. Mitteleur. I (1885) 315; Zahn in Pflzr. IV, 280, 1267; Asch. and Graebn. Synopsis, XII, I, 163.—*H. collinum* + *aurantiacum* N.P. l. c.—*H. aurantiacum-pratense* Zahn l. c.—In the dense pubescence of short hairs on all parts, light green color of leaves, and habit, it is very similar to *H. onegense* Norrl., differing from it by having reddish-saffron-colored florets with red stripes on the outside and rusty dark yellow stigmas.

Plants from the north of the European territory of the Soviet Union; but in Upper Dniester species very similar to them are found, viz. *H. fuscoatrum* N.P. and *H. silvicoliforme* Zahn.

748. **H. rubroonegense** Norrl. Nya nord. Hier. I (1904) 61; Mela-Cajander, Suom. Kasvio, 647; Zahn in Pflzr. IV, 280, 1267.—**Exs.**: Norrl. Hier. exs. fasc. III, No. 120.

Perennial. Stem 20–30 cm high, 1.5–2.0 mm in diameter, violet at base, dark brown above, very densely pubescent with gray hairs 1.5 mm long, thinning upwards, dense again in upper part, moderately glandular and to densely stellate-pubescent above; stolons mostly underground. Basal leaves 2–5, oblong to (narrowly) lanceolate, to 12 cm long (6–7:1), entire, light green, as a whole very densely pubescent with short hairs 0.7–1.0 mm long, on both sides without stellate down or such down only beneath along midrib; cauline leaves 2(–3) (coefficient of leafiness 0.10), narrow, lanceolate, upper leaf rudimentary, with stellate down beneath. Inflorescence compactly umbellate, with 4–7 capitula; acladium 3–6 mm long; peduncles with sparse dark hairs, densely glandular with fine glands, gray-tomentose. Involucres 6.5–7.0 mm long; involucre bracts very narrow, subobtusate, dark, with wide green border and violet tip, with sparse, 20(14–25), dark hairs 1.0–2.0 mm long, with gray tip, with sparse to scattered, 24(15–33), fine glands 0.3–0.5 mm long, scatteredly stellate-pubescent. Corollas reddish-orange; peripheral ones with bright red stripes on outside; stigmas reddish. Flowering June to July.

Wet meadows and slopes.—*European Part*: Dvina-Pechora (western part). Endemic. Described from Pomorye (Tamitsa on the White Sea Coast near Onega River). Type in Helsinki.

Note. Probably, we should include here *H. chaetodermum* Pohle and Zahn (*Allgem. Bot. Zeitschr.* XIII, 1907, 110; *Pflzr.* IV, 280, 1267), described from the northern Urals, and found also in the Tomsk Region. Type is unknown.

749. **H. semionegense** Norrl. *Nya nord. Hier.* I (1904) 60; Mela-Cajander, *Suom. Kasvio*, 647; Zahn in *Pflzr.* IV, 280, 1267.—**Exs.**: Norrl. *Hier. exs. fasc. III*, No. 119.

Perennial. Stem 20–50 cm high, 1.5–3.0 mm in diameter, violet at base, dark above, moderately pubescent with light-colored bristles 1.5–2.5 mm long, scatteredly glandular and moderately stellate-pubescent above, pubescence thinning downward; stolons mostly underground. Basal leaves 1–4, oblong to lanceolate, mostly entire, to 11 cm long (7:1), light green, densely covered on both sides with short, thin hairs to 1 mm long, without stellate down; cauline leaves 1–2 (coefficient of leafiness 0.04), bottom leaf oblong-lanceolate, sessile, with stellate down only beneath along midrib, upper leaf lanceolate or rudimentary. Inflorescence paniculate, with 3–7 capitula; acladium 6–7 mm long; peduncles with occasional hairs, moderately glandular, gray-tomentose. Involucres 7.5–8.0 mm long; involucre bracts narrow to very narrow, subobtusate, blackish-green, with wide white border and light violet tip, with sparse, 20(15–25), hairs to 3 mm long and occasional, 5(3–12), glands 0.3–0.5 mm long, sparsely stellate-pubescent. Corollas saffron-golden or light reddish-colored, with red teeth, peripheral ones with pinkish stripes on outside; stigmas reddish. Flowering June to July.

Wet meadows and slopes.—*European part*: Dvina-Pechora (western part). Endemic. Described from Pomorye Region (Tamitsa and Korelskoe on White Sea Coast near Onega River). Type in Helsinki.

Cycle 4. Chaunanthia Juxip.—*H. chaunantes* (N.P.) Zahn in *Pflzr.* IV, 280, 1249; Asch. and Graebn. *Synopsis*, XII, I, 143.—*H. rubrum* ssp. *chaunantes* N.P. *Hier. Mitteleur.* I (1885) 322.—*H. aurantiacum* > *pilosella* N.P. l. c.; Zahn in *Pflzr.* l. c.; Asch. and Graebn. l. c.—Inflorescence very openly paniculate; leaves with conspicuous (to moderate) stellate down beneath; plants from North.

750. **H. kihlmanii** Norrl. *Pilos. bor.* (1895) 50; Zahn in *Pflzr.* IV, 280, 1250.—**Exs.**: Norrl. *Hier. exs. fasc. II*, No. 60.

662 Perennial. Stem 30–40 cm high, 3–4 mm in diameter, mostly dark red, densely pubescent with white bristles 3–4 mm long, moderately glandular above (glands to middle of stem), densely stellate-pubescent below inflorescence, scatteredly pubescent downward; stolons underground or subaerial, long, thick, colored, without leaves. Basal leaves 2–3, oblong or (mostly narrowly) lanceolate, tapered to winged petiole, to 14 cm long (7:1), moderately pubescent on both sides with hairs 2 mm long, without stellate down above, moderately pubescent beneath (midrib colored); cauline leaves 1–2 (coefficient of leafiness 0.04), bottom leaf large, resembling basal leaves, very acuminate, upper leaf more or less rudimentary, stellate-pubescent beneath. Inflorescence openly paniculate with very remote branches and 5–10 capitula; acladium 10–15 mm long; peduncles moderately pubescent with hairs 3–5 mm long, rather densely glandular, gray-tomentose; floral bracts pale to dull green. Involucres 9–10 mm long; involucre bracts narrow, acute, dark, with distinct pale border and dark violet tip, rather densely dark-pubescent and with rather dense, fine glands, moderately stellate-pubescent. Corollas dark saffron-yellow; peripheral ones with broad, rusty-red stripes on outside. Flowering June to July.

Dry valley meadows.—*European Part*: Dvina-Pechora. Endemic. Described from Pizhma District. Type in Helsinki.

Note. One finds various plants unrelated to *H. stoloniflorum* Waldst. and Kit. under the name *H. stoloniflorum* Waldst. and Kit., in the literature (Ldb. *Fl. Ross.* II, 1844–1846, 846; Lehmann, *Fl. Poln. Livl. Nachtrag.* 75; Puring, *Ocherk. Rast. Zap. Ch. Pek. G.* 1898, 157) and in herbaria (plants from the Baltic Region, Upper Volga, Upper Dnieper and Middle Dnieper regions). In the Upper Dniester one is more likely to come across *H. meringophorum* N.P. (*Hier. Mitteleur.* I, 1885, 328; *Pflzr.* op. cit. p. 1252; Asch. and Graebn. op. cit. p. 147), found in Stanislavov (Upper Dniester), and maybe others from the Series *Chaunanthia*. The occurrence of *H. mickewiczii* Rehm. (*Verh. zool.-bot. Gesell. Wien.* XLV, 1895, 323; *Pflzr.* IV, 280, 1252; Asch. and Graebn. *Synopsis* XII, I, 147) is very doubtful.

Cycle 5. Blyttiana Juxip.—*H. blyttianum* Fr. Cat. hort. Upsål. (1853); Epicr. 21; Lindeb. in Hartm. Nandb. Scand. Fl. ed. 11 (1879) 36; Norrl. in Mela-Cajander, Suom. Kasvio, 642; *Pflzr.* IV, 280, 1258; Asch. and Graebn. *Synopsis*, XI, I, 153.—*Pilosella blyttiana* Sz. Sz. in Flora, XXI (1862) 425.—*H. pyrrhanthes* N.P. Hier. Mitteleur. I (1885) 330.—*H. aurantiacum-auricula* N.P. l. c.; Zahn, l. c., *H. fuscum* Fr. Symb. (1848) 19 p. p.—*H. rhodanthes* Fr. Epicr. l. c.(?)—Corollas purple or orange but then peripheral ones with deep purple stripes; leaves spatulate, glaucous, mostly sparsely (only along margin and beneath along

midrib) pubescent; stolons as in *H. auricula* or underground; tips of involucre bracts violet. In the USSR, plants found frequently in Ladoga-Ilmen District.

- 663 751. *H. aeruginascens* Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 129; Nya nord. Hier. I, 48–49; Mela-Cajander, Suom. Kasvio, 646; Zahn in Pflzr. IV, 280, 1261.—*H. blyttianum* (Fr.) 4 *aeruginascens* N.P. Hier. Mitteleur. I (1885) 339.—**Exs.**: Norrl. Herb. Pilos. Fenn. No. 69, fasc. II, No. 174; Hier. exs. fasc. III, No. 106; Lindb. Pl. Finl. exs. No. 1608.

Perennial. Stem 30–35(15–50) cm high, 1.5–2.0 mm in diameter, reddish-violet at base, very densely pubescent with hairs 1.5 mm long or with dense, spreading hairs 2.5 mm long (var. *detersum* Norrl.), quickly thinning upwards, with solitary dark hairs above, densely or moderately (var. *β. detersum* Norrl.) glandular above (glands thinning downward), densely stellate-pubescent above, thinning downward; stolons dark violet, subaerial, with spatulate (to 6), more or less short leaves. Basal leaves 2–6, oblong-spatulate, rounded-obtuse to lanceolate and subacute, to 10 cm long (3–6:1), glaucescent-frosted, above with occasional hairs near margin, beneath with scattered hairs 0.7–0.8 mm long, along margin sparse, beneath along midrib moderate, as a whole sparsely pubescent, without stellate down above, with sparse down beneath or without them (var. *β. detersum* Norrl.); cauline leaves 1 (coefficient of leafiness 0.03), small, lanceolate, with scattered down beneath. Inflorescence umbellate-paniculate, with 4–10 capitula; acladium 5–8 long; peduncles with occasional bristles 2.0–2.5 mm long, densely or scatteredly (var. *β. detersum* Norrl.) glandular, gray-tomentose. Involucres 6.5–8.0 mm long, cylindrical; involucre bracts somewhat broad, elongated to obtuse, reddish-violet tip, with very light-colored border, sparsely, 15(12–20), pubescent, with hairs 1.5–2.5 mm long, with scattered, 35(30–45), to occasional (10) glands (var. *β. detersum* Norrl.), 0.4–0.5 mm long, almost without stellate down. Corollas yellow- or rusty-red, peripheral ones with red stripes on outside; stigmas dark yellow. Flowering June to July.

Wet meadows and edges of fields and ditches.—*European Part*: Ladoga-Ilmen (northern part). *General distribution*: Scandinavia. Described from Olonets part of Karelia. Type in Helsinki.

Note. We should include here also *H. parvipunctatum* Norrl. (*Nya nord. Hier.* I, 1904, 49; Mela-Cajander, op. cit. pro var.; Zahn in *Pflzr.* l. c. pro var.), described from the Olonets part of Karelia. The type is in Helsinki.

752. *H. discoloratum* Norrl. Anteckn. öfv. Finnl. Pilos. I (1884) 114; Mela-Cajander, Suom. Kasvio, 644; N.P. Hier. Mitteleur. I, 337; Zahn in

Pflzr. IV, 280, 1261.—Exs.: Norrl. Herb. Pilos. Fenn. Nos. 51, 52; Hier. exs. fasc. III, No. 99.

664 Perennial. Stem 30–35(20–60) cm high, 1.5–2.0 mm in diameter, violet at base, dark above, to scatteredly pubescent with bristles 2.5–4.0 mm long, densely glandular in lower part, scatteredly so above, very sparsely glandular and to densely stellate-pubescent at top, stellate hairs thinning downward; stolons long, thin, above-ground, with well developed (to 6) spatulate leaves. Basal leaves 4–6, spatulate, lingulate or lanceolate, with rounded or obtuse, inner leaves sometimes with plicate tip or short-acuminate, entire, glaucescent, to 11 cm long (5.5–8.0:1), glabrous on both sides, along margin and beneath along midrib with occasional hairs 1–2 mm long, as a whole very sparsely pubescent, without stellate down; cauline leaves 1(–2) (coefficient of leafiness 0.04), lanceolate, acute, upper leaf rudimentary, bracteiform. Inflorescence compactly paniculate, with 3–8 capitula; acladium 3–5 mm long; peduncles with occasional hairs 3 mm long, moderately glandular with glands 0.6 mm long, grayish from stellate down; floral bracts dark or gray, with light-colored border. Involucres 8–9 mm long, cylindrical; involuclral bracts wide, subobtuse, dark, with wide light-colored border and sparse, 14(10–20), dark hairs 1.5–2.5 mm long and sparse, 17(15–27), glands 0.7 mm long, almost without stellate down. Corollas dark yellow to reddish inside, with red teeth, outer orange, purple on outside (in dry condition lilac-red); stigmas dark. Flowering June to July.

Wet turfey meadows.—*European Part*: Ladoga-Ilmen (northern part). *General distribution*: Scandinavia (Finland). Described from Finland. Type in Helsinki; paratype in Leningrad.

Note. Apparently, one should include here *H. elfvingii* Norrl. (*Nya nord. Hier.* I, 1904, 50; Mela-Cajander, *Suom. Kasvio*, 644; *Pflzr.* IV, 280, 1261), described from the Olonets part of Karelia (along the Svir River); it differs from *H. discoloratum* by having acute and not obtuse leaves, more attenuate, narrow involuclral bracts and peripheral florets that are very purple on the outside. The type is in Helsinki.

753. **H. pseudo-blyttii** Norrl. in Not. Fa. et Fl. Fenn. XIII (1874) 427; Anteckn. öfv. Finl. Pilos. I. 124; Mela-Cajander, *Suom. Kasvio*, 644; N.P. Hier. Mitteleur. I, 340; Zahn in *Pflzr.* IV, 280, 1261; Samuelsson, Maps of Scand. Hier. sp. No. 7.—Exs.: Norrl. Herb. Pilos. Fenn. I, Nos. 61–64; Hier. exs. fasc. III, No. 100; Lindb. Fl. Finnl. exs. Nos. 1605, 1606.

Perennial. Stem 30–40(15–60) cm high, 1–2 mm in diameter, dark above, sparsely pubescent in lower part with downward-directed, light-colored hairs 1.5–2.0 mm long, above with occasional dark hairs 1 mm long, in general to scarcely scattered, to moderately glandular above, in general sparsely stellate-pubescent; stolons subaerial, very thin,

partly almost above-ground, thin, with spatulate-lanceolate (-5) leaves. Basal leaves 3-7, spatulate to lanceolate, rounded-obtuse to short-acuminate, sometimes with plicate tip, finely spinose-toothed, glaucescent, to 13 cm long (5.5-9.0:1), glabrous above, beneath and along margin with very occasional hairs, along midrib beneath to densely hairy, as a whole to sparsely pubescent with short (0.6-1.5 mm) hairs, almost without stellate down; cauline leaves (0-)1(-2) (coefficient of leafiness 0.03), lanceolate, acute, upper leaf with stellate down beneath along midrib. Inflorescence openly paniculate, with 3-10 capitula; acladium 5-8 mm long; peduncles almost glabrous, to scatteredly glandular, gray-tomentose; floral bracts gray, with light-colored border. Involucres (7.5-)8.0-8.5 mm long, cylindrical; involucral bracts narrow, subacute, dark, with wide green border and violet tip, with occasional to sparse, 12(9-20), hairs 1.0-1.5 mm long and sparse to scattered, 20(16-32), glands 0.3-0.4 mm long, sparsely stellate-pubescent. Central corollas dark yellow, peripheral ones orange with purple stripes on outside; stigmas dark yellow. Flowering June to July. (Plate XXXIX, Fig. 2.)

Wet or dry thin meadows and slopes.—*European Part*: Karelia-Lapland (southern part), Ladoga-Ilmen (northern part). *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. Probably, one should include here *H. fulvolutescens* Norrl. (Mela-Cajander, *Suom. Kasvio*, 1906, 645; *Pflzr.* IV, 280, 1261), described from the coastal areas of Lake Ladoga (from the Ladoga part of Karelia), and also *H. clinoglossum* Norrl. (*Nya nord. Hier.* I, 46; *Pflzr.* I. c.), described from the Karelian Isthmus. The type is in Helsinki.

754. **H. vernicosum** Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 123; *Nya nord. Hier.* I, 51; Mela-Cajander, *Suom. Kasvio*, 645; Zahn in *Pflzr.* IV, 280, 1261 (nota).—**Exs.**: Norrl. *Hier. exs. fasc.* III, No. 107 (var. *oblongilingua* Norrl.).

Perennial. Stem 12-25 cm high, 1.0-1.5 mm in diameter, dark above, at base with moderate hairs 1.5-2.0 mm long, in middle with scarce, above sparse, gray bristles with black base, as a whole to densely pubescent, very densely glandular above, with very thin and tiny glands (0.2-0.3 mm long), thinning downward, densely stellate-pubescent below inflorescence, greatly thinning downward; stolons above-ground or underground. Basal leaves 3-4, lingulate-oblong to lanceolate, to 6 cm long (4.5-7.0:1), pale glaucescent-green, almost glabrous on both sides, hairs scattered along margin, dense beneath along midrib, 1 mm long, as a whole pubescence to scattered, without stellate down; cauline leaves 2 (coefficient of leafiness 0.01), bottom leaf larger, lanceolate, acute, with broad, somewhat amplexicaul base, upper small,

more or less rudimentary, with sparse hairs beneath. Inflorescence paniculate, with 3–8 capitula; acladium 3–5 mm long; peduncles almost glabrous, with moderate glands 0.3 mm long, gray-tomentose. Involucres 7.5–8.0 mm long; involucre bracts narrow, subobtusate, with wide white border, pale, with violet tip, dull green or reddish with occasional (8) gray hairs 1 mm long and sparse (20) glands 0.3 mm long, scatteredly stellate-pubescent. Corollas reddish; peripheral ones purple on outside; stigmas dark. Flowering June to August.

666 Grass, grass-forb meadows.—*European Part*: Ladoga-Ilmen. Endemic. Described from Olonets part of Karelia (Ladva). Type in Helsinki.

755. **H. pulvinatum** Norrl. Anteckn. öfv. Finl. Pilos. I (1884) 127; Mela-Cajander, Suom. Kasvio, 645; N.P. Hier. Mitteleur. I, 341; Zahn in Pflzr. IV, 280, 1261.—*Pilosella pulvinata* Norrl. Anteckn. l. c.—**Exs.**: Norrl. Herb. Pilos. Fenn. Nos. 67, 68, sub **Pilos. pulv.**; Meinsh. Herb. fl. Ingr. fasc. X, No. 5 (pro *H. decolorans*).

Perennial. Stem 25–45 cm high, 1.5–2.0 mm in diameter, violet-brown above, to densely pubescent with stiff, erect, light-colored hairs 1.0–1.5(–3.0) mm long, densely glandular above (glands thinning quickly) and conspicuously stellate-pubescent, hairs thinning downward; stolons underground, thin. Basal leaves to 6, lingulate to lanceolate, subobtusate, remotely toothed, to 12 cm long (4–8:1), dark green, almost glaucous, with occasional hairs above and beneath near margin (or glabrous), sparsely hairy along margin, moderately so beneath along midrib, as a whole sparsely pubescent with hairs 1–2 mm long, stellate down lacking or sparse beneath along midrib; cauline leaves 1(–2) (coefficient of leafiness 0.04), bottom leaf lanceolate, somewhat amplexicaul, with stellate down beneath. Inflorescence compact-umbellate, with 3–10 capitula; acladium 4–5 mm long; peduncles almost glabrous, densely glandular, gray-tomentose, floral bracts whitish or gray. Involucres 8–9 mm long, cylindrical; involucre bracts somewhat broad, obtuse to subobtusate, blackish, with wide green border and reddish-violet tip, with sparse, 23(20–30), light-colored hairs 0.5–1.0 mm long, and equally sparse, 18(17–20), glands 0.6 mm long, scatteredly stellate-pubescent. Corollas dark yellow, peripheral ones pale purple on outside (var. *lutescens* N.P.) or reddish-yellow, 'on outside deep purple (var. *purpurascens* N.P.); stigmas dark yellow. Flowering June to July.

Wet hummocky meadows.—*European Part*: Baltic Region (Estonian SSR), Ladoga-Ilmen (northern part). *General distribution*: Scandinavia. Described from Finland. Type in Helsinki.

Note. Apparently, here we should include *H. integrilingua* Norrl. (*Nya nord. Hier.* I, 1904, 47; Mela-Cajander, Suom. Kasvio, 646; Zahn

in *Pflzr.* IV, 280, 1261.—**Exs.:** Norrl. *Hier. exs.* III, No. 105), which differs from *H. pulvinatum* by having entire leaves and hairs on the involucre bracts to 2.5 mm long; the bracts are almost without stellate down. Found in Ladoga-Ilmen (in the Ladoga part of Karelia). The type is in Helsinki.

756. *H. torquescens* Norrl. *Nya nord. Hier.* I (1904) 52; Mela-Cajander, *Suom. Kasvio*, 645 (nota); Zahn in *Pflzr.* IV, 280, 1261.—**Exs.:** Norrl. *Hier. exs. fasc.* III, Nos. 107, 108.

- 667 Perennial. Stem 25(12–33) cm high, 1–2 mm in diameter, violet at base, violet-brown in upper part, densely pubescent in lower part with white bristles 2.0–2.5 mm long, thinning upward, above with sparse, dark bristles 1 mm long, densely glandular above (glands thinning downward to middle of stem), scatteredly stellate-pubescent; stolons underground. Basal leaves 3–5, outer short, spatulate, rounded-obtuse, others oblong-lanceolate, acute, to 7 cm long (4.0–5.5:1), entire or very finely toothed (spinosely), pure green, scattered-pubescent above, densely so beneath and along midrib, very densely to scatteredly along margin, as a whole moderately pubescent with hairs 0.8–1.5 mm long, without stellate down above, with very sparse down beneath along midrib; cauline leaves 1–2 (coefficient of leafiness 0.07), bottom leaf lanceolate, with broad, somewhat amplexicaul base, acute, upper rudimentary, with sparse stellate hairs beneath (along midrib). Inflorescence paniculate, with 3–5 capitula, acladium 3–5 mm long; peduncles glabrous or with occasional hairs, with very dense glands 0.4 mm long, gray-tomentose. Involucres 8.0–8.5 mm long; involucre bracts narrow, acute, dark, almost without border, with violet tip and occasional, 10(8–12), dark hairs 1 mm long, with sparse, 19(17–21), glands 0.4 mm long, sparsely stellate-pubescent. Corollas rust-colored, peripheral ones with purple stripes on outside; teeth of peripheral florets deeply incised, easily curling on drying; stigmas dark. Flowering June to July.

Wet meadows.—*European Part:* Ladoga-Ilmen (northern part). Endemic. Described from Olonets part of Karelia (Ladva). Type in Helsinki.

Note. Zahn also included *H. rhodanthum* Fr. in this species, apparently erroneously reported by Fries as collected in Dauria (Zahn, l. c.).

Section 20. Auriculina N.P. *Hier. Mitteleur.* I (1885) 58, 115, 184, 782; Zahn in *Pflzr.* IV, 280, 1195; Asch. and Graebn. *Synopsis*, XII, I, 6, 69.—Characters in key to sections (p. 8).

Stem low, somewhat ascending, with rosette of basal leaves; in conditions of adequate nutrition plants always have long, mostly thin,

glabrous or sparsely pubescent, rooting stolons, with remote spatulate leaves, increasing in size toward tip; leaves spatulate to linear, entire, more or less glaucous, without stellate down (or with occasional hairs beneath along midrib), but in subsection *Schultesia* to moderately stellate-pubescent beneath; inflorescence compactly (rarely openly), paniculate umbel, but, in forms transitional to section *Pilosellina* (subsection *Schultesia*), shallowly to deeply dichotomous; involucre bracts, peduncles, and stem conspicuously glandular (glands mostly down to base of stem); corollas mostly sulfur-yellow (in subsection *Schultesia* peripheral ones with somewhat reddish stripes on outer side). European species, not found in the extreme north as well as south, are absent in Great Britain also.

KEY TO SUBSECTIONS OF SECTION *AURICULINA*

1. Inflorescence paniculate, with small number (2–7) of capitula; leaves without stellate pubescence.....Subsection 1. **Auricula** Juxip
- + Inflorescence shallowly or deeply dichotomous, with small number (2–5) of capitula; leaves sparsely to moderately stellate-pubescent beneath.....Subsection 2. **Schultesia** Juxip

Subsection 1. *Auricula* Juxip.—*H. auricula* Lam. and DC. Fl. fr. IV, (1805) 24, emend.; Froel. in DC. Prodr. VII, 202; Fr. Epicr. 19; Hartm. Handb. Scand. Fl. ed. 11, 36; Norrl. Anteckn. öfv. Finl. Pilos. I, 89; Mela-Cajander, Suom. Kasvio, 636; N.P. Hier. Mitteleur. I, 185; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I, 48; Lindm. Svensk Fan.-Fl. 2 ed. 594; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1075; Pflzr. IV, 280, 1195; Asch. and Graebn. Synopsis, XII, I, 70.—*H. dubium* L. Fl. Suec. ed. 2 (1755) 272 p. p.; Willd. Sp. pl. III, 1563.—*H. auricula* Ldb. Fl. Ross. II (1844) 846 p. p.; Schmalh. Fl. II, 156 p. p.—Leaves completely lacking stellate pubescence beneath (or very rarely with occasional stellate hairs along midrib); inflorescence paniculate; florets concolored; light (sulfur) yellow.

The members of subsection *Auricula*, being typical mesophytes, have clear preference for wet soils in meadows, glades and pastures; they tolerate shade (grow well in dense grass) and considerable soil acidity (to pH 5.2).

In the Soviet Union, species of subsection *Auricula* are found in the northwestern and western parts of the European territory of the Soviet Union, not crossing 62° North. Moreover, their northeastern-

southwestern boundary passes roughly along the Skytyvkar-Gorky-Serpukhov-Gomel-Zhitomir-Chernovtsy line. References in the literature to the occurrence of species of *Auricula* eastward and southward of this line are based on incorrect identifications or need to be verified. The map of the general distribution of *H. auricula* s. l., Zahn (*Pflzr.* IV, 280, 1923, 1196) shows the distribution beyond the Urals, which does not agree with the reality. In the same reference, the assumption is made that this species is absent in the Caucasus. Earlier authors had, in fact, reported *H. auricula* growing in the Caucasus, apparently confusing it with *H. longiscepum* Boiss. and Kotschy.

Specimens with a single capitulum almost always have the rudiment of a second one. In any case, on planting in good soil, the plants always develop a paniculate inflorescence. Under cultivation, the plants gain height, but all relationships of important characters remain unchanged.

1. Involucral bracts glabrous or with very rare hairs.....2.
- + Involucral bracts conspicuously (occasionally) pubescent.....5.
2. Involucral bracts acute or subacute, very numerous, sparsely glandular, always glabrous, as peduncles and stem.....
.....757. **H. acutisquamum** N.P.
- 669 + Involucral bracts obtuse or subobtuse.....3.
3. Involucral bracts somewhat broad, black, with unclear border, with sparse to scattered glands.....758. **H. melaneilema** N.P.
- + Involucral bracts narrow, with white border.....4.
4. Involucral bracts with sparse to scattered, 25(15–40), glands 0.5–0.8(–1.0) mm long; floral bracts black, with wide light border.....759. **H. auricula** Lam. and DC.
- + Involucral bracts to moderately, (40–60), glandular, glands 1.0–1.2(–2.0) mm long; peduncles densely glandular; floral bracts whitish.....760. **H. lithuanicum** N.P.
- 5 (1). Involucral bracts acute or subacute, with light-colored border, pubescence of light-colored hairs.....6.
- + Involucral bracts subobtuse, blackish, with unclear border, pubescent with black bristles; peduncles with sparse, light-colored hairs; involucre 8–9 mm long.....
.....763. **H. amaureilema** N.P.
6. Involucral bracts somewhat broad.....761. **H. magnaauricula** N.P.
- + Involucral bracts narrow.....762. **H. tricheilema** N.P.

Cycle 1. Eu-auricula Juxip.—Involucral bracts glabrous.

757. **H. acutisquamum** N.P. Hier. Mitteleur. I (1885) 190; Zahn, Hier. fl. Mosquens. 12; Pflzr. IV, 280, 1197; Asch. and Graebn. Synopsis, XII, I, 72.

Perennial. Stem 5–25 cm high, 1.5–2.0 mm in diameter, glabrous, moderately glandular above, glands gradually thinning downward, almost without stellate down; stolons somewhat elongated. Basal leaves spatulate, obtuse, plicate, glaucous, very sparsely pubescent, with occasional cilia 2–3 mm long only along margin and beneath along midrib near base; without stellate down; cauline leaves 1 (coefficient of leafiness 0.07), in rosette. Inflorescence paniculate, with 2–4 capitula; acladium 3–8 mm long; peduncles glabrous, scatteredly glandular, white-tomentose. Involucres 7.0–8.5 mm long, ovate, thickish; involucral bracts numerous, narrow, subacute to acute, dark, with narrow white border, glabrous, sparsely glandular, almost without stellate down. Corollas light yellow; stigmas yellow. Flowering May to July.

Meadows and forest edges.—*European Part*: Baltic Region, Ladoga-Ilmen, Upper Volga, Upper Dniester. *General distribution*: Central Europe, Mediterranean, Region, Balkans-Asia Minor (western part). Described from Galicia. Type in Munich.

758. **H. melaneilema** N.P. Hier. Mitteleur. I (1885) 186; Zahn in Pflzr. IV, 280, 1197; Asch. and Graebn. Synopsis, XII, I, 72.—*Exs.*: Hier. 670 Naeg. Nos. 66, 118; Dahlst. Hier. Scand. VII, No. 19; GRF No. 1256.

Perennial. Stem (5–)10–25 cm high, 1.0–1.5 mm in diameter, glabrous, with occasional glands, almost without stellate down; stolons elongated, thin. Basal leaves spatulate to lanceolate, obtuse to subobtuse, glaucous, glabrous or with occasional cilia 1–2 mm long at base of leaves, without stellate down; cauline leaves 1 (coefficient of leafiness 0.07), with occasional cilia 2–3 mm long at base, along margin and beneath along midrib. Inflorescence paniculate, with 1–4 capitula; acladium (3–)5–8 mm long; peduncles glabrous, with scattered to sparse glands, gray from stellate down; floral bracts black, with inconspicuous border. Involucres 7–8 mm long, ovate; involucral bracts somewhat broad, obtuse, black, with inconspicuous border glabrous (typical form) or to scatteredly pubescent, sparsely to scatteredly glandular, with very sparse stellate down. Corollas light yellow; stigmas yellow. Flowering June to July.

Mainly in middle and alpine montane zones where multitude of forms has evolved, which are distinguished by nature of pubescence; seldom found in plains.—*European Part*: Baltic Region (southern part), Ladoga-Ilmen (Pskov!), Upper Dniester. *General distribution*: Scandinavia (southern part), Central Europe, Mediterranean, Region,



Balkans-Asia Minor (western part). Described from former East Prussia. Type in Munich.

759. **H. auricula** Lam. and DC. ex N.P. Hier. Mitteleur. I (1885) 189; Norrl. Bidr. Skand. Hier.-Fl. I, 26; Dahlst. Beitr. Hier.-Fl. Oesels, 17; Zahn, Hier. fl. Mosquens. 13; Pflzr. IV, 280, 1198; Asch. and Graebn. Synopsis, XII, I, 73, sub *H. eu-auricula typicum* Zahn.—**lc.**: Syreistsch. Fl. Mosk. Gub. III (1910) 349–350.—**Exs.**: Hier. Naeg. Nos. 63, 64, 209, 248; Fr. Herb. norm. fasc. VI, No. 6, XI, No. 14; Hier. Europ. No. 13; Callier, Fl. Siles. exs. No. 1103; Baenitz, Herb. Europ. Nos. 1491, 2533, 6316, 6317, 6438, 6636; Zahn, Hier. Europ. Nos. 207, 807; Dahlst. Hier. Scand. VIII, No. 9, XI, Nos. 48, 49; Norrl. Herb. Pilos. Fenn. I, Nos. 21–23; II, No. 162; Hier. exs. fasc. III, Nos. 68–71, fasc. V, Nos. 14–16; GRF Nos. 1254, 1255, 2206.

Perennial. Stem 5–20(–40) cm high, 0.5–2.0 mm in diameter, glabrous at base or with occasional hairs, sparsely to scatteredly glandular above, glands decreasing to base, almost without stellate down; stolons long (to 25 cm), thin to somewhat thick, with 6–11 spatulate leaves. Basal leaves 8(3–13), spatulate to (narrowly) lanceolate, obtuse, plicate, glaucous, somewhat lustrous, to 10 cm long (6–7:1), with occasional cilia 5–7 mm long only along margin and along midrib beneath near base, without stellate down; cauline leaves 1 (coefficient of leafiness 0.05), without or with occasional stellate down beneath along midrib. Inflorescence paniculate, with (1–)2–5(–8) capitula; 673 accladium 4–10 mm long; peduncles glabrous, with scattered glands, gray- or whit-tomentose; floral bracts black, with wide white border. Involucres (5–)6–8(–9) mm long, ovate; involucral bracts narrow, obtuse to subobtuse, blackish-green, with white border, glabrous or with occasional hairs (mainly at tips of bracts and then, not on all—*f. subpilosum* Dahlst.), with scattered, 25(15–40), glands 0.5–0.8(–1.0) mm long, with very sparse stellate down, glabrous along margin. Corollas sulfur yellow; stigmas yellow; achenes 1.5 mm long. Flowering June to July, sometimes second flowering August to September. (Plate XXXII, Fig. 2.)

Meadows, forest edges, seaside meadows and edges of marshy lands, mainly in plains, in mountains to 2,500 m.—*European Part*: Karelia-Lapland (southern part), Dvina-Pechora, Baltic Region, Ladoga-Ilmen; Upper Volga, Upper Dnieper, Upper Dniester. *General distribution*: Scandinavia (southern part), Central Europe, Atlantic Europe (eastern part), Mediterranean, Region, Balkans-Asia Minor (western part). Described from Sweden. Type unknown.

Note. A highly polymorphic species with a host of forms in Central Europe, which are distinguished by minor, difficult-to-assess

characters that, however, do not pose any problem in the identification of the species. S. Omang (*Die Hieracien Norwegens*, I, 1935, 30) was undoubtedly right in saying that *H. auricula*, by comparison with other species of hawkweeds, is an easily identifiable species.

About 50% of all the examined specimens had well-developed pollen.

760 ***H. lithuanicum*** N.P. Hier. Mitteleur. I (1885) 192; Zahn in Pflzr. IV, 280, 1198; Asch. and Graebn. Synopsis, XII, I, 73.—**Exs.**: Rehm. and Wol. Fl. Polon. exs. No. 52.

Perennial. Stem (13–)20–30 cm high, 1.0–1.5 mm in diameter, with occasional, light-colored, hairs 2 mm long at base, moderately glandular above, glands thinning toward base, very sparsely stellate-pubescent above; stolons long, very thin. Basal leaves 6–8, spatulate-linear, obtuse, glaucous, with occasional hairs 1.5–3.0 mm long, without stellate down along margin and beneath along midrib close to base; cauline leaves 1 (coefficient of leafiness 0.04), near rosette. Inflorescence openly paniculate, with 2–3(–5) capitula; acladium 8–14 mm long, branches very remote; peduncles glabrous, to densely glandular, grayish from pubescence; floral bracts whitish. Involucres 6.0–6.5(–7.5) mm long, ovate; involucre bracts narrow, obtuse, dark, with white border, glabrous (or sometimes with occasional hairs), with moderate, (20–)40–60, large glands 0.8–1.2(–2.0) mm long, very sparsely (margins glabrous) stellate-pubescent. Corollas light yellow; stigmas yellow. Flowering June to July.

Meadows and pastures.—*European Part*: Baltic Region, Upper Dnieper. *General distribution*: Central Europe (eastern part). Described from Lithuania. Type in Munich; paratype in Lvov.

674 **Cycle 2. *Tricheilema*** Juxip.—Involucre bracts with conspicuous hairs.

761. ***H. magnauricula*** N.P. Hier. Mitteleur. I (1885) 192; Zahn, Hier. fl. Mosquens. 12; Pflzr. IV, 280, 1198; Asch. and Graebn. Synopsis, XII, I, 73.—*H. auricula* var. *majus* Fr. Novit. fl. Suec. ed. 2 (1828) 249; Epicr. 20; Lindbe. in Hartm. Handb. Scand. Fl. ed. 10, 2.—*H. auricula* β . *vahlianum* Froel. in DC. Prodr. VII (1838) 201.—*H. auricula* η . *trichocephalum* Froel. in DC. Prodr. p. 202.—*H. auricula* var. *elatum* Froel. l. c.—*H. auricula* var. *caulescens* Fr. Symb. (1848) 4.—*H. auricula* γ . *spurium* P.M.E. Fl. Preuss. (1850) 337.—*H. auricula* b. *glaucescens* Garcke, Fl. Deutschl. (1878) 224.—*H. saturicolor* Dahlst. Hier. Scand. VI (1894) No. 51.—**Exs.**: Hier. Naeg. No. 67; Callier. Fl. Siles, exs. No. 1232; Zahn, Hier. Europ. No. 508.

Perennial. Stem 20–35 cm high, 1–3 mm in diameter, with sparse bristles, scatteredly glandular above, glands thinning downward, scatteredly stellate-pubescent above, down thinning downward; stolons long, often somewhat thick. Basal leaves spatulate, obtuse, glaucous, with occasional cilia 4–5 mm long along margin and beneath along midrib toward base, without stellate down; cauline leaves 1 (coefficient of leafiness 0.04), near rosette. Inflorescence paniculate, with (2–)4–7 capitula; acladium 5–15 mm long; peduncles glabrous or with occasional hairs, moderately to scatteredly glandular, gray-tomentose. Involucres 7–9 mm long, ovate; involucre bracts somewhat broad, acute, dark green, with light border, with occasional, light-colored hairs 1.0–1.5 mm long, and scattered glands (var. *subcalvum* N.P.) or with dark, to scattered hairs 2–4 mm long and glands (var. *pilosum* N.P.), with very sparse stellate down (margins glabrous). Corollas light yellow; stigmas yellow. Flowering June to July.

Meadows, pastures, forests edges and roadsides.—*European Part*: Baltic Region (southern part), Upper Volga, Upper Dniester. *General distribution*: Scandinavia (southern part), Central Europe, Atlantic Europe (eastern part), Balkans-Asia Minor (western part). Described from former East Prussia. Type in Munich.

762. **H. tricheilema** N.P. Hier. Mitteleur. I (1885) 191; Zahn in Pflzr. IV, 280, 1199; Asch. and Graebn. Synopsis, XII, I, 74.

Perennial. Stem 10–20(–40) cm high, 1.5–2.0 mm in diameter, sparsely to scatteredly pubescent with hairs 2–3 mm long, scatteredly glandular above (glands quickly thinning downward), scatteredly stellate-pubescent above, hairs very sparse downward; stolons elongated, somewhat thin. Basal leaves spatulate to lanceolate, obtuse, glaucous, with occasional soft cilia 3–4 mm long, along margin and beneath along midrib, without stellate down; cauline leaves 1 (coefficient of leafiness 0.05), near rosette. Inflorescence paniculate, with 2–4 capitula; acladium 4–8 mm long; peduncles glabrous, moderately glandular, gray-tomentose. Involucres 6.5–8.0 mm long, ovate; involucre bracts narrow, 675 subacute, dark, with white border, with scattered light-colored hairs 1.5 mm long and occasional to sparse glands, very sparsely stellate-pubescent (margins glabrous). Corollas light yellow; stigmas yellow. Flowering June to August.

Meadows and forest edges, mainly in montane regions to 2,400 m.—*European Part*: Upper Dniester. *General distribution*: Scandinavia (southern part), Central Europe, Atlantic Europe. Described from Bavaria. Type in Munich.

763. **H. amaureilema** N.P. Hier. Mitteleur. I (1885) 191; Zahn in Pflzr. IV, 280, 1199; Asch. and Graebn. Synopsis, XII, I, 74.—Exs.: GRF Nos. 1807, 2207.

Perennial. Stem 7–25(–50) cm high, 1–2 mm in diameter, with scattered, light-colored hairs at base, thinning upward to occasional, sparsely glandular above, glands quickly thinning, very sparsely stellate-pubescent; stolons long, thin. Basal leaves 6(3–9), spatulate-linear to almost linear, obtuse to subacute, glaucous, with occasional, cilia 2–3 mm long along margin and beneath along midrib near base, without stellate down; cauline leaves 1 (coefficient of leafiness 0.04), near rosette. Inflorescence paniculate, with 2–5(–7) capitula; acladium 3–20 mm long, branches often remote; peduncles with sparse light-colored hairs, moderately glandular, gray from stellate down. Involucres 8–9 mm long, ovate; involucre bracts narrow, subobtusely, blackish, with unclear border, with sparse (sometimes to occasional), 7(5–10), black bristles and sparse to occasional, 16(10–22), glands 0.7–1.2 mm long, sparsely stellate-pubescent (margins glabrous). Corollas light yellow; stigmas yellow. Flowering June to August.

Meadows and forest edges, mainly in montane regions.—*European Part*: Baltic Region, Upper Volga, Upper Dniester. *General distribution*: Central Europe, Atlantic Europe, Mediterranean Region. Described from Sudeten. Type in Munich.

Subsection 2. Schultesia Juxip.—*H. schultesii* F. Schultz, Arch. fl. Fr. Allem. I (1842) 35, II (1850) 177; Zahn in Pflzr. IV, 280, 1211; Asch. and Graebn. Synopsis, XII, I, 89.—*H. auricula-pilosella* N.P. Hier. Mitteleur. I (1885) 222.—*H. nudifolium* Norrl. Herb. Mus. Fenn. ed. 2 (1889) 153.—*H. psilophyllum* G. Anderss. apud Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I (1890) 47.—Inflorescence shallowly or deeply dichotomous (both types of dichotomy often on same plant!); leaves sparsely to moderately stellate-pubescent beneath (usually, leaves of stolons more densely pubescent); glands usually well-developed on inflorescence and stem; peripheral corollas mostly with red stripes on outside; plants not high. Plants rare, found within the range of *H. auricula*; in most cases, apparently hybrids of *H. auricula-pilosella*.

Plants having a simple stem (unbranched) are usually with difficulty considered *Schultesia*, as the decisive character in these cases is the density of stellate pubescence beneath on basal leaves, never surpassing the level of hyaline-tomentose (under high magnification it is possible to count the number of stellate hairs on a specific area of leaf, which is not possible in species of *H. pilosella*). Besides, on carefully collected plants, one almost always can find some with a dichotomous inflorescence alongside single-headed specimens.

1. Involucral bracts hairy.....2.
- + Involucral bracts glabrous.....764. **H. frondosum** N.P.
2. Involucral bracts with very few (3–4) hairs; involucre 10–11 mm long; teeth of peripheral florets squarrose.....765. **H. squarrosulum** Norrl.
- + Involucral bracts with sparse to scattered hairs.....3.
3. Involucral bracts with very sparse black hairs and moderate to dense glands (ratio of hairs to glands roughly 20:80); involucre 10–11 mm long.....766. **H. subatriceps** Zahn
- + Hairs and glands on involucral bracts of more or less equal density.....4.
4. Involucral bracts broad, with scattered, light-colored hairs; involucre 8–9 mm long; glands in inflorescence rather large, 0.5–0.7 mm long.....767. **H. schultesii** (F. Schultz.) N.P.
- + Involucral bracts narrow, with scattered, dark hairs; involucre 9.0–10.5 mm long; glands in inflorescence small, 0.3–0.4 mm long.....768. **H. mendelii** N.P.

764. **H. frondosum** N.P. Hier. Mitteleur. I (1885) 230; Zahn, Hier. fl. Mosquens. 14; Pflzr. IV, 280, 1214.—**!c.**: Syreistsch. Fl. Mosk. Gub. III, 350, sub *H. schultesii* F. Schultz.

Perennial. Stem (10–)25–35 cm high, 1.0–1.5 mm in diameter, somewhat ascending or erect, often with scattered stems, with sparse, light-colored hairs 1.5–2.0 mm long, with sparse glands above, thinning down to middle of stem, grayish above from downward-thinning stellate down; stolons elongated, somewhat thick, with remote, somewhat large leaves, increasing in size toward tip of stolon. Basal leaves 11–13, oblong-lanceolate, rounded-obtuse to subacute, glaucescent, with occasional bristles 3–5 mm long above, with scattered soft hairs 2–3 mm long beneath, as a whole to scatteredly pubescent, without stellate down above, moderately pubescent beneath (young leaves grayish); cauline leaves 0–1 (coefficient of leafiness 0.02), small. Inflorescence dichotomous (or sometimes simple), with 1–2 capitula; accladium to half as long as stem. Involucre 9–10 mm long, ovate to subglobose; involucral bracts narrow, acute, dark gray, with narrow, light green border, glabrous, with moderate or to dense (60–90) glands 0.7 mm long, grayish from stellate down including margin. Corollas yellow, concolored or sometimes somewhat reddish on outside. Flowering June to July.

Meadows and glades.—*European Part*: Baltic Region, Upper Volga. Described from Munich (from a spontaneous hybrid). Type in Munich.

765. **H. squarrosulum** Norrl. Herb. Pilos. Penn. II (1894) No. 153; Pilos. bor. 32; Zahn in Pflzr. IV, 280, 1212.—*Pilosella squarrosula* Norrl. l. c.—**Exs.:** Norrl. Herb. Pilos. Penn. fasc. II, No. 153.

Perennial. Stem 8–15 cm high, 1 mm in diameter, ascending, weak, brownish above, sparsely pubescent with light-colored hairs 1.5–2.5 mm long, densely glandular above, glands thinning downward, distinctly stellate-pubescent; stolons to 7 cm long, hairy and stellate-downy, with rather large (5) spatulate to lanceolate leaves. Basal leaves broadly lingulate-lanceolate to lanceolate, obtuse to subacute, very sparsely pubescent, without stellate down above, to hyaline-tomentose beneath from stellate down; cauline leaves absent. Inflorescence forked or simple, with (1–)2 capitula; acladium about 50% as long as stem or more. Involucres 10–11 mm long, ovate; involucre bracts somewhat broad, acute, dark, with white border, with occasional (3–4), light-colored hairs 1 mm long, with moderate to dense, 63(55–75), glands 0.6 mm long, grayish from stellate down. Corollas sulfur yellow, teeth of peripheral florets squarrose, usually red on outside; stigmas yellow. Flowering June to July.

Dry valley meadows.—*European Part:* Ladoga-Ilmen (northern part). Endemic? Described from banks of Svir River. Type in Helsinki; paratype in Leningrad.

766. **H. subatriceps** Zahn in Engl. Pflzr. IV, 280 (1923) 1213; Asch. and Graebn. Synopsis, XII, I, 94.—*H. atriceps* Dahlst. Beitr. Hier.-Fl. Oesels, 16; non N.P., nec Blocki.

Perennial. Stem 10–20 cm high, 1.0–1.5 mm in diameter, very sparsely pubescent with hairs 2.5–3.0 mm long, very densely glandular above, to scatteredly so in middle and in lower part of stem, densely stellate-pubescent above, pubescence thinning downward; stolons thin, quite long (to 13 cm), with 3–8 small, lanceolate, acute leaves, becoming smaller toward tip of stolon. Basal leaves 5–10, oblong-lanceolate to linear-lanceolate, subobtuse to acute, to 5 cm long (5:1), glaucous, above with occasional bristles 3–4 mm long, beneath with scattered, along midrib dense and along margin sparse cilia 1.5–2.5 mm long, as a whole scatteredly pubescent, without stellate down above, beneath with up to almost dense stellate down; stems with only floral bracts. Inflorescence shallowly to deeply dichotomous, with 2 capitula; acladium 30–110 mm long. Involucres 10–11 mm long, truncate; involucre bracts somewhat broad, acute, with red cusp, with very sparse, 10(9–16), black hairs 1.5–3.0 mm long, crowded mainly near tip, with moderate to dense, 50(35–75), black glands 0.6–0.7 mm long, with scattered stellate down. Corollas yellow, peripheral ones with bright purple stripe on outside. Flowering July.

Meadows and deciduous forest edges.—*European Part*: Baltic Region. Endemic? Described from Saaremaa (Oesel) Island. Type in Stockholm.

767. **H. schultesii** (F. Schultz) N.P. Hier. Mitteleur. I (1885) 228; Zahn in Pflzr. IV, 280, 1216; Asch. and Graebn. Synopsis, XII, I, 96, sub *H. schultesii typicum* Zahn.

Perennial. Stem 15–25 cm high, 1.0–1.5 mm in diameter, ascending, scatteredly pubescent with hairs 1–3 mm long (denser at base and above), densely glandular above, glands gradually thinning downward to base, moderately hairy, above grayish from stellate down; stolons elongated, thin. Basal leaves oblong-lanceolate to lanceolate, obtuse to subacute or narrowly lanceolate (var. *β. pseudo-schultesii* N.P.), glaucescent, on both sides with occasional hairs 3–5 mm long, above without stellate down, beneath with such down moderate to hyaline-tomentose; cauline leaves 0–1. Inflorescence shallowly to deeply dichotomous, with 2 capitula; acladium 10–90% as long as stem. Involucres 8–9 mm long, subglobose; involucre bracts broad, acute, blackish, with light border, with scattered, light-colored hairs 1 mm long (f. *pilosum* N.P.) or glabrous (f. *epilosum* N.P.), moderately glandular, grayish from stellate down. Corollas yellow; peripheral ones with reddish teeth. Flowering June to July.

Meadows and glades, forest edges.—*European Part*: Baltic Region (southern part), Upper Volga, Upper Dnieper, Upper Dniester. *General distribution*: Central Europe, Atlantic Europe. Described from Bavaria from artificial hybrid. Type may or may not be in Munich.

768. **H. mendelii** N.P. Hier Mitteleur. I (1885) 230; Zahn, in Pflzr. IV, 280, 1214; Asch. and Graebn. Synopsis, XII, I, 94.—*Exs.*: Hier. Naeg. No. 13.

Perennial. Stem 10–20 cm high, 1.0–1.5 mm in diameter, scatteredly pubescent with hairs 2.0–2.5 mm long, scatteredly glandular, glands thinning downward, conspicuously stellate-pubescent; stolons long, thin. Basal leaves narrowly lanceolate, acute, glaucescent, on both sides sparsely pubescent with hairs 3–5 mm long, without stellate down above, hyaline-tomentose beneath; cauline leaves 0(–1). Inflorescence shallowly or deeply dichotomous, with 2 capitula; acladium (20)50–90% of stem length; peduncles with scattered hairs 2.0–2.5 mm long, densely glandular with fine glands, gray-tomentose. Involucres 9.0–10.5 mm long, subglobose; involucre bracts narrow, acute, with light border, with scattered, dark hairs 1.0–1.5 mm long, moderately fine-glandular, grayish from stellate down (margin glabrous). Corollas

yellow; peripheral ones reddish on outside or concolored. Flowering June to July.

Meadow.—*European Part*: Ladoga-Ilmen. *General distribution*: Central Europe. Described from artificial hybrid produced by Mendel. Type in Munich.

- 679 *Section 21. Pilosellina* N.P. Hier. Mitteleur. I (1885) 58, 114, 777; Zahn in Pflzr. IV, 280, 1149; Asch. and Graebn. Synopsis, XII, I, 5, 7.—Stirps *H. pilosellae* Fr. Symb. (1844) 13, p. majore p.—Section I. *Eupilosella* Sz. Sz. in Flora XXI (1862) 422.—*H. pilosella* Brenner in Acta Soc. Fa. Fl. Fenn. 25(1903) No. 2.—Characters in key to sections (p. 8). Stem scapose, arising from basal rosette, with single large capitulum (often with collateral scapes), very rarely deeply dichotomously branched. Basal leaves obovate and obtuse to lanceolate and acute, white- or gray-tomentose beneath from dense stellate down (in older herbarium specimens tomentum turning reddish with time), very rarely, stellate down on both sides; leaves on both sides sparsely to moderately pubescent, with long bristles above and shorter and softer hairs beneath, visible with difficulty against background of white or gray tomentum, and only with help of skilfully directed incident light; ligules of peripheral corollas almost always with red stripes on outside or their teeth reddish; with adequate nutrition and in the absence of growth suppression always develops stolons.

Throughout Europe, excluding Ireland and Scotland; Northwestern Africa, Western Asia.

KEY TO SUBSECTIONS OF SECTION *PILOSELLINA*

1. Stolons short, thick, with clustered, equal-sized, more or less large leaves, differing little in size and form from basal leaves; involucre bracts more or less broad to very broad (1.5–3.0 mm)2.
- + Stolons long, thin to somewhat thick, with small, remote leaves becoming smaller toward tip of stolon; involucre bracts 0.5–1.5 mm wide, subacute to acute.....Subsection 3. **Pilosella** Juxip
2. Involucre bracts ovate, with rounded tip, or more or less oblong, short-acuminate with obtuse tip (at least in outer bracts)Subsection 1. **Hoppeana** Juxip
- + Involucre bracts long-acuminate from broad base into acute tip.....Subsection 2. **Peleteriana** Juxip

Subsection 1. Hoppeana Juxip.—*H. hoppeanum* Schult. Fl. Austr. 2, II (1814) 428; N.P. Hier. Mitteleur. I, 118; nec Froel.; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1074; Grossh. Fl. Kavk. IV, 274.—*Grex H. hoppeanum* Zahn in Pflzr. IV, 280 (1923) 1151; Asch. and Graebn. Synopsis, XII, I, 14.—*H. pilosella* var. *grandiflorum* Fr. Symb. (1848) 3.—*H. pilosellaeforme* Hoppe in Sturm. Deutschl. Fl. 37 (1817) t. 6 and in Denkschr. bot. Ges. Regensb. II (1818) 138; Froel. in DC. Prodr. VII, 199.—*H. pilosella* var. *hoppeana* Monn. Essai (1829) 18; Koch, Synopsis, 2, II (1844) 510.—*H. pilosella* b. *alpinum* Fr. Epicr. (1862) 11.—*Pilosella hoppeana* Sz. Sz. in Flora XXI (1862) 421.—*H. algoicum* Froel. ex Sendtn. in Flora (1854) 322.—Characters in key to subsection.

1. Leaves without stellate down above, white-tomentose beneath2.
- + Leaves on both sides stellate-pubescent; scatteredly tomentose above, white-tomentose beneath.....775. **H. cilicicum** N.P.
2. Involucral bracts broad, 2–3 mm or even broader.....3.
- + Involucral bracts narrower, 1–2(–2.5) mm wide.....8.
3. Involucral bracts dark to blackish.....4.
- + Involucral bracts light-colored or gray.....5.
4. Involucral bracts 3 mm wide, stellate pubescent to margin, ratio of hairs to glands roughly 70:30.....769. **H. hoppeanum** N.P.
- + Involucral bracts 2.3 mm wide, stellate-pubescent scarcely extending to margin, ratio of hairs to glands roughly 30:70770. **H. virentisquamum** N.P.
5. Leaves more or less wide (elliptical to lanceolate); involucral bracts light-colored.....6.
- + Leaves narrowly lanceolate, acute; involucral bracts lead-gray, long; involucre large, 13 mm long.....774. **H. macrolepium** N.P.
6. Involucres 10–11 mm long.....7.
- + Involucres 7–9 mm long; involucral bracts sparsely pubescent but densely glandular (ratio of hairs to glands roughly 20:80)773. **H. antennarioidiforme** Zahn
7. Involucral bracts eglandular.....771. **H. pilisquamum** N.P.
- + Involucral bracts with sparse glands; all parts of plants to densely stellate-pubescent (whitish).....772. **H. perileucum** Schelk. and Zahn
- 8 (2). Involucral bracts glabrous or with occasional hairs.....9.
- + Involucral bracts more or less conspicuously pubescent.....10.
9. Involucral bracts 2 mm wide; involucre 10–11 mm long; leaves to scatteredly pubescent.....776. **H. hypeuryum** N.P.
- + Involucral bracts narrower, 1.5 mm wide; involucre 9.5 mm long; leaves to densely pubescent.....777. **H. multisetum** N.P.

10. Involucral bracts sparsely pubescent; ratio of hairs to glands roughly 50:50.....778. **H. lasiothrix** N.P.
 + Involucral bracts moderately to densely pubescent, with occasional glands or almost eglandular.....11.
 11. Involucres 10–11 mm long; leaves covered with bristles 3.0–4.5 mm long; stolons short.....
 681779. **H. lamprocomoides** Woron. and Zahn
 + Involucres 10.5–12.0 mm long; leaves covered with bristles 6–8 mm long; stolons somewhat elongated.....
780. **H. lamprocomum** N.P.

Cycle 1. Hoppeana Juxip.—Grex. *H. hoppeanum* Zahn in Pflzr. IV. 280 (1923) 1151; grex *H. eu-hoppeanum* Zahn in Asch. and Graebn. Synopsis, XII, I (1922) 15.—*H. hoppeanum* Schult. Fl. Austr. 2, II (1814) 428.—*H. macranthum* Ten. Syll. fl. Napol. (1813) 399 p. p.—Stolons short, thick; leaves without stellate down above; involucre (8–)11–13(–14) mm long; involucral bracts 2–3 mm wide, dark, with light border.

769. **H. hoppeanum** N.P. Kier. Mitteleur. I (1885) 119; Zahn in Pflzr. IV, 280, 1152; Asch. and Graebn. Synopsis, XII, I, 15.—*H. hoppeanum* *β. typicum* Rouy and Foucaud. Fl. France. IX (1905) 239.—**Ic.:** Rchb. Ic. fl. Germ. XIX (1859) 53, t. 108, f. II; Hegi, Ill. Fl. VI, 2, 1196.—**Exs.:** Fr. Hier. Europ. No. 1; Baenitz, Herb. Europ. No. 1256; Zahn, Hier. Europ. No. 201 bis, 301; Fl. Austro-Hung. exs. No. 3002; Hier. Naeg. Nos. 115, 241, 261.

Perennial. Stem 10–30 cm high, 2–3 mm in diameter, scapose, with scattered to moderate hairs 3–4 mm long, to densely glandular above (glands thinning downward to middle of stem), grayish-green from stellate down; stolons short, thick. Basal leaves 6–12, lanceolate to oblong-lanceolate, subobtusate or subacute (4:1), moderately pubescent on both sides with almost soft, white hairs 5–6 mm long above, 2–4 mm long beneath, without stellate down above, white-tomentose beneath. Inflorescence single-headed. Involucres (10–)11–13(–14) mm long, compressed-subglobose, with truncate base; involucral bracts to 3 mm wide, blackish, with white border, obtuse (inner subobtusate), scatteredly to sparsely pubescent with hairs 1.0–1.5 mm long, with sparse to dense glands 0.4–0.6 mm long, gray from stellate down, also along margin. Corollas light yellow, peripheral ones mostly with red stripes on outside; stigmas yellow. Flowering May to August. (Plate XXXIV, Fig. 1.)

Subalpine and alpine meadows, to 2,400 m.—**European Part:** Crimea, **Caucasus:** Eastern, Western, and Southern Transcaucasia,

Talysh.—*General distribution*: Central Europe, Mediterranean Region, Balkans-Asia Minor. Described from Switzerland. Type in Munich.

Note. Highly polymorphic, it apparently is an aggregate species, distinguished mainly by the nature of the pubescence and, in this respect, resembling *H. pilosella* L.

770. *H. virentisquamum* N.P. Hier. Mitteleur. I (1885) 120; Zahn in Pflzr. IV, 280, 1152; Asch. and Graebn. Synopsis, XII, I, 16.—*H. macranthum* β . Bertol. Fl. Ital. VIII (1850) 457.

- 682 Perennial. Stem 15–20 cm high, thin, almost glabrous or with moderate hairs 2.0–2.5 mm long, densely glandular above, glands thinning downward to base, grayish from stellate down; stolons short, thick. Basal leaves 4–7, lanceolate or oblong-lanceolate, mostly obtuse, to 7 cm long (4–5:1), with sparse, white, soft hairs 3–5 mm long, without stellate down above, white-tomentose beneath. Inflorescence single-headed. Involucres 11.5–12.0 mm long (or 9–10 mm.—var. *minoriceps* Zahn), ovate; involucral bracts 2.3 mm wide, dark, with green border, subobtuse, glabrous or with occasional or to scattered hairs to 1 mm long, densely (80–125) glandular, with light-colored glands 0.4–1.0 mm long with dark base and yellow head, crowded toward tip of bracts, involucral bracts grayish-green from stellate down, margins (almost) without down. Corollas yellow; stigmas yellow. Flowering June to August.

Mountain meadows, to 2,100 m.—*Caucasus*: Western Transcaucasia. *General distribution*: Central Europe, Mediterranean, Balkans-Asia Minor (eastern Anatolia, former Artvin District). Described from Switzerland. Type in Munich.

Cycle 2. Macrantha Juxip.—Grex *H. macranthum* (Ten.) Zahn in Pflzr. IV, 280 (1923) 1152; Asch. and Graebn. Synopsis, XII, I, 16.—*H. pilosella* var. *macranthum* Ten. Fl. Nap. IV (1830) 114 p. p., V (1835–1836) 190, t. 184, f. 3; Fr. Epicr. 11.—*H. macranthum* Boiss. Fl. or. III (1875) 860.—Grex *Macranthum* N.P. Hier. Mitteleur. I (1885) 119, 122.—Stolons short or somewhat longish, more or less thick; leaves without stellate down above; involucres (8–)10–12 mm long; involucral bracts 1.3–2.0(–2.5) mm wide, often densely stellate-pubescent; light-colored, with very light border; often numerous collateral stems developed; peripheral corollas mostly with conspicuous red stripes on outside.

771. *H. pilisquamum* N.P. Hier. Mitteleur. I (1885) 124; Zahn in Pflzr. IV, 280 (1923) 1154.

Perennial. Stem to 20 cm high, 2 mm in diameter, often with collateral 1–2 stems, glabrous or somewhat pubescent (var. β . *galaticum*

Freyn), sparsely glandular above, glands quickly thinning downward, tomentose above, becoming bare downward; stolons short, thick. Basal leaves elliptical to elliptical lanceolate, obtuse, weakly glaucescent, with scattered stiff hairs 4 mm long, without stellate down above, velutinous-white-tomentose beneath. Inflorescence single-headed. Involucres 10–11 mm long, subglobose; involucre bracts 2.5 mm wide, light-colored, outer obtuse, inner subacute, moderately pubescent with light-colored hairs 1 mm long, eglandular, white-tomentose from stellate down (including margin). Corollas yellow. Flowering June to August.

Mountains, to 2,760 m.—*Caucasus*: Eastern Transcaucasia (eastern Anatolia). *General distribution*: Balkans-Asia Minor. Described from Asia Minor. Type in Munich.

- 683 772. **H. perileucum** Schelk. and Zahn in Izv. Kavk. Muzeya, VII (1912) 130; Pflzr. IV, 280, 1154.

Perennial. Stem 20–30 cm high, scapose, 1–2 mm in diameter, with hairs up to scattered, 5.0–2.5 mm long, moderately glandular above, glands thinning downward, white-tomentose; stolons short (to 5 cm long), densely and long-white-pubescent and white-tomentose, with reddish leaves (to three-fourths' length of basal leaves). Basal leaves 4–8, elliptical or oblong, obtuse to subacute, to 6 cm long (4.5:1), with hairs 2.5 mm long, with sparse bristles 5 mm long above, as a whole to sparsely pubescent (leaves of stolons more densely hairy), without stellate down above, white-tomentose beneath. Inflorescence single-headed. Involucres 9.0–10.5 mm long; outer involucre bracts ovate, to 2.5 mm wide, inner narrow, acute, with scattered (30) white hairs 1.0–1.5 mm long, and equally scattered (40) glands 0.3–0.5 mm long, white-tomentose. Corollas yellow, peripheral ones with red stripes on outside; stigmas yellow. Flowering June to July.

Mountains, alpine meadows, at 2,100–2,400 m.—*Caucasus*: Western and Southern Transcaucasia. Endemic. Described from Svanetia (Becho Mountains). Type in Tbilisi.

773. **H. antennarioidiforme** Zahn in Vestn. Tifl. Bot. Sada, 21 (1912) 1; Pflzr. IV, 280, 1155.

Perennial. Stem 20 cm high, sparsely pubescent, scatteredly glandular above, glands thinning downward, gray from down; stolons somewhat elongated, thick. Basal leaves spatulate to lanceolate, obtuse, to 5 cm long, soft-pubescent, without stellate down above, white-tomentose beneath. Inflorescence single-headed. Involucres 7–9 mm long; involucre bracts (inner) with wide green border, obtuse, sparsely

pubescent, densely glandular, moderately stellate-pubescent. Corollas yellow, peripheral ones with red teeth. Flowering June to August.

Alpine meadows.—*Caucasus*: Western Transcaucasia. Endemic. Described from Svanetia (Muzhal). Type unknown.

774. **H. macrolepium** N.P. Hier. Mitteleur. I (1885) 124; Pflzr. IV, 280, 1155.

Perennial. Stem 30–40 cm high, 2 mm in diameter, with scattered hairs 2–3 mm long, sparsely glandular above, thinning to none below, rather densely stellate-pubescent; stolons short, somewhat thick. Basal leaves narrowly lanceolate, tapered toward base, acute, glaucescent, with occasional, white, soft hairs 4–5 mm long, without stellate down above, white-tomentose beneath. Inflorescence single-headed. Involucres 13 cm long, ovate; involucre bracts 2.5 mm wide, long (outer 6–7 mm, lead-gray, with indistinct border, subacute), inner acute, with moderate light-colored hairs 0.8 mm long, with occasional glands, gray from stellate pubescence (along margin moderately pubescent). Corollas yellow, peripheral ones with red teeth. Flowering July.

684 Mountain slopes.—*European Part*: Crimea. *General distribution*: Mediterranean Region. Described from Italy. Type in Munich.

Cycle 3. Cilicia Juxip.—Grex *H. cilicicum* N.P. Hier. Mitteleur. I (1885) 121; Zahn in Pflzr. IV, 280, 1156.—Differs from *Macrantha* by leaves being stellate-pubescent on both sides.

775. **H. cilicicum** N.P. Hier. Mitteleur. I (1885) 121; Zahn in Pflzr. IV, 280, 1156.—*H. pilosella* Kotschy, Iter. cilicic. in Bulgar Dag. No. 141 p. p.—*H. pilosella* **velutinum*¹ Fr. Epicr. (1862) 12 p. p.—*H. centrifugum* Ianka in Sched.

Perennial. Stem to 25 cm high, glabrous, scatteredly glandular above, glands thinning toward base, densely stellate-pubescent; stolons short, somewhat thick, with few equal-sized leaves. Basal leaves oblong, subacute, to 6 cm long, thick, to moderately pubescent on both sides: with stiff hairs 4–6 mm long above and shorter, softer hairs beneath, with scattered stellate down above (hence, leaves grayish-green), velutinous-white-tomentose beneath. Inflorescence single-headed. Involucres 11 mm long, compressed; involucre bracts ovate, 1.3–1.5 mm wide, dark, with inconspicuous border, subacute, with occasional hairs 1 mm long only at base, but densely glandular, gray from stellate down, but occasional stellate down along margin. Corollas yellow. Flowering June to August.

¹Asterisk before *velutinum* not explained in text—General Editor.



Mountains, to 2,760 m.—*Caucasus*: Eastern Anatolia (former Artvin District). *General distribution*: Balkans-Asia Minor. Described from Asia Minor. Type in Munich.

Cycle 4. Hypeurya Juxip.—*H. hypeuryum* N.P. Hier. Mitteleur. I (1885) 178, 781; Zahn in Pflzr. IV, 280, 1187; Asch. and Graebn. Synopsis, XII, I, 61; Grossh. Fl. Kavk. IV, 274 (Omn. ut. sp. coll.).—*H. pilosella* γ. *grandiflorum* Scheele in Linnaea, XXXI (1862) 642.—*H. hoppeanum-pilosella* N.P. l. c.—*Hoppeanum-pilosella* Zahn, l. c.

Differs from *Hoppeana* by having somewhat more elongated stolons and dark involucre bracts only 1.3–2.0 mm wide, of which only outer obtuse; stolons with more or less approximate, large leaves (in habit, plants resemble those of species of cycle *Macrantha*).

These are considered hybridogenous species between *Hoppeana* and *Pilosella*, but, possibly, they represent a transition from the ancient *Hoppeana* to the more recent *Pilosella*. In general these plants are rare, growing sometimes even in places where one of the putative parents is absent (for example, in the Pyrenees where *Hoppeana* are not represented).

- 687 776. **H. hypeuryum** N.P. Hier. Mitteleur. I (1885) 178; Zahn in Pflzr. IV, 280, 1187.—*H. eu-hypeuryum* Zahn in Asch. and Graebn. Synopsis, XII, I (1922) 61.—*Exs.*: Hier. Naeg. Nos. 7, 238; Zahn, Hier. Europ. No. 606 p. p.

Perennial. Stem 10–20 cm high, 2–3 mm in diameter, (sometimes with collateral stems), mostly glabrous, densely glandular above, glands thinning toward base, gray from stellate down; stolons short or somewhat elongated, somewhat thick, quite densely leafy. Basal leaves 5–8, oblong-lanceolate, subobtuse to acute, to 6 cm long (4:1), scatteredly pubescent with soft bristles 3–8 mm long, without stellate down above, velutinous-white-tomentose beneath. Inflorescence single-headed. Involucres 10.0–11.5 mm long, thick, subglobose; involucre bracts 2 mm wide, somewhat dark, with inconspicuous border, outer obtuse, followed by subobtuse, inner subacute, with reddish-violet cusp, glabrous (f. *calvum* N.P.). or with occasional to sparse hairs (f. *pilosius* N.P.), with moderate long glands 0.5–1.5 mm long, gray from stellate down (including up to margin). Corollas yellow, peripheral with red stripes on outside; stigmas yellow. Flowering June to August.

Meadows in alpine zone, to 2,400 m.—*Caucasus*: Eastern, Western and Southern Transcaucasia. *General distribution*: Central Europe, Atlantic Europe, Mediterranean Region, Balkans-Asia Minor. Described from Switzerland. Type in Munich.

777. **H. multisetum** N.P. Hier. Mitteleur. I (1885) 126; Zahn in Pflzr. IV, 280, 1153; Asch. and Graebn. Synopsis, XII, I (1922) 18.

Perennial. Stem up to 20 cm high, 1.5 mm in diameter, glabrous, densely glandular above, glands gradually thinning toward base, densely stellate-pubescent; stolons short, thick. Basal leaves spatulate or lanceolate, subobtusate, in dry condition yellowish-green, to densely pubescent with bristles 4–5 mm long, without stellate down above, velutinous-white-tomentose. Inflorescence single-headed. Involucres 9.5 mm long; involucre bracts 1.5 mm wide, dark, with narrow border, outer obtuse, inner acute, glabrous or only outer bracts with occasional hairs 1 mm long at tip, moderately glandular, gray from stellate down. Corollas yellow; peripheral ones with weak red stripes on outside. Flowering June to July.

Subalpine and alpine zones of mountains, to 2,300 m.—Caucasus: Talysh. *General distribution*: Central Europe (southeastern part), Balkans-Asia Minor, Armenia-Kurdistan. Described from Transylvania. Type in Munich.

778. **H. lasiothrix** N.P. Hier. Mitteleur. I (1885) 179; Zahn in Pflzr. IV, 280, 1188; Asch. and Graebn. Synopsis, XII, I, 62.—Exs.: Fr. Hier. Europ. No. 1d; Hier. Naeg. No. 208; Zahn, Hier. Europ. No. 606 p. p.

688 Perennial. Stem 10–25 cm high, 1–2 mm in diameter, scatteredly pubescent with hairs 1–3 mm long, densely glandular above, glands gradually thinning to base, grayish from stellate down; stolons somewhat elongated, thickish, with leaves half as long as basal leaves. Basal leaves 4–9, lanceolate or oblong-lanceolate, subacute, to 6 cm long (4.5:1), scatteredly pubescent with soft hairs 5–7 mm long, without stellate down above, velutinous-white-tomentose beneath. Inflorescence single-headed. Involucres 10.5–12.0 mm long, thick, subglobose; involucre bracts to 2.0 mm wide, blackish, with narrow light border, outer subobtusate, inner acute, with scattered (40–50) dark hairs 1.0–2.5 mm long, and scattered (20–60) glands 0.5 mm long, gray from stellate down (margins sparsely downy). Corollas yellow; peripheral ones usually with red stripes on outside; stigmas yellow. Flowering June to August.

Alpine meadows and pastures, to 2,500 m.—Caucasus: Eastern, Western, and Southern Transcaucasia. *General distribution*: Central Europe, Atlantic Europe, Mediterranean Region. Described from Switzerland. Type in Munich.

779. **H. lamprocomoides** Woron. and Zahn in Vestn. Tifl. Bot. Sada, 11 (1908) 12; Pflzr. IV, 280, 1188.

Perennial. Stem to 10–30 cm high, 2 mm in diameter, with sparse hairs 1.0–2.5(–4.0) mm long, moderately glandular above, glands thinning downward to base, gray from stellate down; stolons rather short, somewhat thick, with large, oblong, obtuse leaves (stolons as in *Hoppeana*). Basal leaves 1–2, obovate to oblong, obtuse to subacute, mostly with sparse bristles 3.0–7.0 mm long, without stellate down above, white-tomentose beneath. Inflorescence single-headed. Involucres 10–11 mm long, ovate; involucre bracts to 2.0 mm wide, subacute, dark, with wide, light border, with moderate, 63(45–80), stiffish light-colored bristles 2 mm long with black base, with sparse, 23(20–30), glands 0.3–0.5 mm long, densely stellate-pubescent (along margin glabrous). Corollas yellow, peripheral ones with red teeth on outside.

Alpine meadows.—*Caucasus*: Eastern Transcaucasia. Endemic. Described from vicinity of Akhaltsikhe. Type in Tbilisi.

780. ***H. lamprocomum*** N.P. Hier. Mitteleur. I (1885) 179; Zahn in Engl. Pflzr. IV, 280, 1189; Asch. and Graebn. Synopsis, XII, I, 63.—**Exs.**: Zahn, Hier. Europ. No. 206.

Perennial. Stem 12–30 cm high, to 2 mm in diameter, moderately pubescent with light-colored hairs 3–4 mm long, moderately glandular above, glands quickly thinning downward to middle of stem, grayish from stellate down; stolons somewhat elongated and thickish. Basal leaves oblong-lanceolate, subacute, pure green, with sparse bristles 6–8 mm long, without stellate down above, gray-tomentose beneath.
689 Inflorescence single-headed. Involucres 10.5–12.0 mm long, ovate; involucre bracts to 1.5 mm wide, dark gray, with narrow, light green border, with moderate gray hairs 1.5 mm long, almost eglandular or with occasional glands, gray from down, margins green (almost without down). Corollas yellow; peripheral ones with red stripes on outside. Flowering June to August.

Mountain meadows and pastures, to 2,000 m.—*European Part*: Crimea; *Caucasus*: : Eastern and Western Transcaucasia. *General distribution*: Central Europe, Balkans-Asia Minor. Described from Switzerland. Type in Munich.

Subsection 2. Peleteriana Juxip.—*H. peleterianum* Merat. Nouv. Fl. Paris, ed. 1 (1812) 305; Lam. and DC. Fl. fr. V, 437; N.P. Hier. Mitteleur. I, 127; Zahn in Pflzr. IV, 280, 1156; Asch. and Graebn. Synopsis, XII, I, 20.—*Pilosella macrolepis* Norrl. Anteckn. öfv. Pilos. Fenn. I (1884) 56.—*H. macrolepideum* Norrl. Bidr. Skand. Hier.-Fl. (1888) 18; Mela-Cajander, Suom. Kasvio, 625; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I, 8; Lindm. Svensk. Fan.-Fl. 2 ed. 593; Zahn in Fedtsch. and Flerow, Fl. Evrop. Ross. 1074.—*H. sabulosorum* Dahlst. Bidr.

Sydöstr. Sverig. Hier.-Fl. I (1890) 9.—Characters in key to subsections of section *Pilosellina*.

1. Involucral bracts more or less wide, 1.5–2.0 mm, light-colored, glabrous or with sparse (rarely to moderate) hairs, densely (to scatteredly) glandular. Leaves more or less sparsely pubescent.....781. **H. sabulosorum** Dahlst.
- + Involucral bracts narrower, 1.0–1.6 mm wide, somewhat dark, moderately to scatteredly pubescent, eglandular or with sparse glands; leaves more or less densely pubescent.....
.....782. **H. pachylodes** N.P.

Cycle 1. Macrolepidea Juxip.—*H. macrolepideum* Norrl. Bidr. Skand. Hier.-Fl. (1888) 18; Mela-Cajander, Suom. Kasvio, 625; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I, 9.—Involucral bracts acuminate from broad base, colored; stolons short, thick.

Note. On the distribution map, Zahn (*Pflzr.* IV, 280, 1923, 1150) shows the distribution boundary of *Peletieriana* including also two islands in the Baltic Sea, viz. Hiiumaa (Dagö) and Saaremaa (Oesel), despite the fact that species belonging here have not been found there to date.

781. **H. sabulosorum** Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. (1890) 9; Zahn, in *Pflzr.* IV, 280, 1157; Asch. and Graebn. Synopsis, XII, I, 23.—*Pilosella macrolepidea* var. *gracilior* Norrl. Anteckn. öfv. Pilos. Fenn. I (1884) 57.—*H. pilosella macranthum* Fr. Symb. (1848) 3 and Epicr. (1862) 11 p. p.—*H. pilosella* var. *grandiflorum* Afzel. Nov. fl. Gottl. (1844) 18.—*H. macrolepideum* var. Norrl. Bidr. Skand. Hier.-Fl. (1888) 18; Herb. Mus. Fenn. 2, 120.—*H. macrolepideum* Norrl. in Fedtsch. and Flerow, Fl. Evrop. Ross. (1910) 1074.—**Exs.:** Dahlst. Hier. exs. fasc. I, No. 1; Hier. Scand. fasc. VI, Nos. 1–38; Norrl. Herb. Pilos. 690 Penn. fasc. II, Nos. 101–103; Hier. exs. fasc. II, Nos. 1–5.

Perennial. Stem 5–25 cm high, 1–2 mm in diameter, erect, often with 2–5 collateral stems, with occasional hairs (rarely to sparsely pubescent), mostly densely (rarely to moderately) glandular (glands over entire stem but more dense in upper part), densely stellate-pubescent above, down thinning downward; stolons mostly short (1–3 cm long), thick, pubescent with soft hairs and stellate hairs, hence appearing snow-white (old herbarium specimens reddish), with rather large same-sized leaves (stolons often rudimentary). Basal leaves 7–9, broadly or narrowly lanceolate or oblong, subobtuse to acute, to 15 cm long, pure green, with scattered bristles 3–7 mm long above, (almost) glabrous beneath, scatteredly hairy beneath along midrib with hairs

1.5–2.5 mm long, along margin with occasional hairs 1.5–3.0 mm long, as a whole sparsely pubescent, without stellate down above, white-tomentose beneath. Inflorescence single-headed. Involucres 10–12 mm long, thick; involucre bracts more or less broad, 1.5–2.0 mm wide, ovate-lanceolate, acuminate, with wide green border, tip reddish-violet, glabrous or with sparse (less often to moderate), light-colored hairs 1.0–2.5 mm long and densely to scatteredly glandular (glands 0.5–1.5 mm long, black or waxy), densely stellate-pubescent (including margins). Corollas sulfur yellow; peripheral ones usually with broad purple stripes on outside; stigmas yellow. Flowering July to August.

Sandy and stony talus, rocks and open sunny slopes, in zone of spruce and birch elfin forests, mainly in subalpine zone.—*European Part*: Karelia-Lapland, Dvina-Pechora. *General distribution*: Scandinavia. Described from Sweden. Type in Stockholm?

Note. A highly polymorphic species, varying mainly in pubescence and glandularity. According to Dahlstedt's description, the involucre bracts in *H. sabulosorum* are entirely or almost entirely glabrous (but densely glandular); this description agrees very well with Norrlin's specimens of *H. macrolepideum* var. *gracilior* collected on the Åland Islands for distribution [as *exsiccatae*]. In Zahn's opinion, they agree well with *H. subpeleterianum* var. *tonsum* N. The plants examined by us from the Khibiny Mountains (and also from Chunutundra and Varzuga), although similar in habit, are distinguished by the density and ratio of hairs and glands on the involucre bracts, a fact pointed out by B. Mishkin in his work (*Flora Khibinskikh Gor* [Flora of the Khibiny Mountains], 1953, 71). On the other hand, we have seen the specimens collected by Dahlstedt in Sweden and identified by him as *H. macrolepideum* Norrl. var. *sabulosorum* Dahlst., with very dense and long pubescence, but almost entirely devoid of glands on the involucre bracts and, thus, very closely resembling *H. peleterianum* Merat. It follows from this that this collective species needs careful study. It is interesting that the forms with both predominant hairs and predominant glands were almost exclusively collected near the sea; and, although they have not been found to date in our collections, they probably can be found along the coasts of the Barents Sea or White Sea.

We are giving here a tentative key to the forms of *H. sabulosorum* Dahlst. discovered so far in our country.

1. Hairs on involucre bracts occasional, glands very dense (ratio on average 5:95).....f. *tonsum* Juxip
- + Hairs on involucre bracts sparse to moderate.....2.

2. Hairs on involucre bracts sparse; glands dense (ratio on average 20:30).....f. *laticeps* Zahn
- + Hairs on involucre bracts scattered to moderate.....3.
3. Glands on involucre bracts scattered (ratio of hairs to glands on average 30:50).....f. *pauciglandulosum* Juxip
- + Glands on involucre bracts dense (ratio of hairs to glands on average 35:65).....f. *tschunense* Juxip

Cycle 2. *Pachylodea* Juxip.—*H. pachylodes* N.P. Hier. Mitteleur. I (1885) 180; Zahn in Pflzr. IV, 280, 1189; Asch. and Graebn. Synopsis, XII, I, 63.—*H. peleterianum-pilosella* N.P. l. c.; Zahn, l. c.—Differs from *H. pilosella* by having thick, short, densely white-pubescent stolons, leaves densely long-pubescent above, and involucre bracts acuminate from broad base.

Together with the species of *Peleteriana*.

782. ***H. pachylodes*** N.P. Hier. Mitteleur. I (1885) 180; Zahn in Pflzr. IV, 280, 1190; Asch. and Graebn. Synopsis, XII, I, 65.

Perennial. Stem 5–10(–30) cm high, 1–2 mm in diameter, pubescent in varying degrees with light or somewhat dark hairs 1–3 mm long, densely glandular above, glands thinning downward, gray from stellate down, often with collateral stems (2–4); stolons thick, densely white-pubescent, with leaves more or less remote and smaller than basal leaves. Basal leaves elliptical to lanceolate, obtuse to acuminate, more or less densely covered with light-colored bristles, 4–8 mm long above, 2–4 mm beneath, without stellate down above, white-tomentose beneath. Inflorescence single-headed. Involucres 10–11 mm long, ovate; involucre bracts 1.0–1.6 mm wide, tapered from broad base into cusp, moderately to scatteredly pubescent with light-colored hairs 1–2 mm long, glandular hairs mostly completely absent or in small number, short. Corollas yellow; peripheral ones with red stripes on outside. Flowering July to August.

Sands or rocks.—*European Part*: Karelia-Lapland. *General distribution*: Scandinavia, Central Europe. Described from Bavaria. Type in Munich.

Note. Included on the basis of Zahn's report regarding the distribution of this species up to the Khibiny Mountains.

692 **Subsection 3. *Pilosella* Juxip.**—*H. pilosella* L. Spec. pl. (1753) 800 p. p.; Zahn in Pflzr. IV, 280 (1923) 1158; Asch. and Graebn. Synopsis, XII, I (1922) 24.—Characters in key to subsections of section *Pilosellina*.

1. Leaves without stellate down above or sometimes with occasional down along midrib (Cycle *Eupilosella* (Zahn) Juxip).....783. **H. pilosella** L. (coll.)
- + Leaves with stellate down on both sides, more or less dense above, white- or gray-tomentose beneath (Cycle 2. *Velutina* Juxip).....2.
2. Stem simple, scape 6–13 cm high; plants of the North.....784. **H. poliophyton** Zahn
- + Stem repeatedly (dichotomously) brached, 15–40 cm high; plants of Caucasus.....785. **H. kemulariae** Juxip

Cycle 1. **Eupilosella** Zahn.—*H. eu-pilosella* Zahn in Asch. and Graebn. Synopsis, XII, I (1922) 25.—*Grex H. pilosella* Zahn in pflzr. IV 280 (1923) 1159.—*H. pilosella* L. and auct. al.—Leaves without stellate down above (very rarely occasional down observed along midrib).

783. **H. pilosella** L. Spec. pl (1753) 800 p.p.; ed. 2 (1763) 1125 p. p. Willd. Sp. pl. III (1800) 1563; M.B. Fl. Taur.-Cauc. II, 251; Froel. DC Prodr. VII, 199 p. p.; Ldb. Fl. Ross. II, 845; Fr. Symb. 2 p. p.; Epicr. 10 p. p.; Boisl. Fl. or. III 860; N. P. Hier. Mitteleur. I, 130; Dahlst. Bidr. Sydöstr. Sverig. Hier.-Fl. I, 20; Beitr. Hier.-Fl. Oesels, 12; Lindm., Svensk Fan.-Fl. 2 ed. 594; Schmalh. Fl II, 155; Mela-Cajander, Suom. Kasvio, 625; Zahn in Fedtsch. and Flerow, Fl Evrop. Ross. 1074; Zahn Hier. fl. Mosquens. 8; Pflzr. IV, 280, 1158; Hegi, Ill. Fl. VI, 2, 1198; Asch. and Graebn. Synopsis, XII, I, 25; Grossh. Fl. Kavk. IV, 274; Krylov, Fl. Zap. Sib. XI, 3064.—**Ic.**: Hegi, l. c.; Syreistsch. Fl Mosk. Gub. III, 349; Majevski, Fl. VIII, ed. (1954) 637,—**Exs.**: (out of the large number of exsiccatae distributed of this collective species, we are listing only those that concern our native flora); GRF Nos. 1282a, b, 1283, 1284, 1827–1829, 2081, 2232–2234, 2235a, b, c, 2236; Hier. Naeg. No. 54; Callier, Herb. Rose No. 72; Rehm. and Wol. Fl. Polon. exs. No. 51; Zahn, Hier. Europ. Nos. 105, 401a, 707, 802; Norrl. Herb. Pilos. Fenn. fasc. II, Nos. 25, 115, 117, 124, 126, 128, 136–137, 142, 143; Hier. exs. fasc. III, Nos. 2, 3, 8, 10–11, 36, 37, 40, 41, 46, 51–54.

Perennial. Stem 20(5–30) cm high, scapose (very rarely with one small cauline leaf), but with some floral bracts (often collateral scapes develop from the same rosette), distinctly stellate-pubescent, particularly in upper part, pubescence and glands in varying ratios and density, stem appreciably elongated after anthesis; stolons (2–10), usually well developed, to 30 cm long (they seem to be absent but after transplanting plants to good conditions stolons develop immediately and even branch), usually scatteredly pubescent and densely stellate-pubescent, with remote (to 10), spatulate to lanceolate, small, leaves to

3 cm long, becoming smaller toward tip, conspicuously setose (mostly more densely than on basal leaves), without stellate down above, white-tomentose beneath. Basal leaves (3–)6–11 in well developed rosette; outermost generally withering usually as more or less brown remnants) before anthesis, outer ones obovate, spatulate, inner lanceolate, to 12 cm long, entire or very rarely with occasional teeth, bluish-green or olive-(grayish-)green, less often pure green, often more or less violet, mostly to scatteredly pubescent, above with occasional to moderate, white bristles 3–10 mm long (yellow or brownish in old herbarium specimens), beneath with scattered soft white hairs 1–5 mm long (not very recognizable against background of white tomentum), with moderate to dense hairs 1–6 mm long beneath along midrib, without stellate down above (sometimes occasional hairs along midrib) white- or gray-tomentose beneath (yellowed in old herbarium specimens), but seemingly grayish-green beneath on plants grown in shade. Inflorescence simple, with single, medium or large capitulum, very rarely deeply dichotomous. Involucres 10(8–12–14) mm long, ovate or subglobose; involucre bracts narrow, 0.5–1.2 mm wide, less often, broader, linear, acute, green or dark, often with light border, more or less densely stellate-pubescent, with hairs and glands in the most diverse ratios and densities. Corollas light to dark-yellow; peripheral ones almost always with red stripes on outside; stigmas yellow; achenes 1.5–2.0 mm long. Flowering May to August; forms from plains often flower in autumn for second time (August to September).

Edges or short-grass meadows of open pine forests, on sandy or stony soil, on old dunes, sands, along roadsides and ditches, on banks, in logged areas, pastures, old fields. In the south in mountains, in subalpine and alpine meadows, on edges of moraines, often forming colonies.—*European Part*: All regions except Arctic, Trans-Volga, Lower Volga, Lower Don becoming much less frequent in the south-eastern direction; *Caucasus*: Apparently, in all regions except Talysh; *Western Siberia*: Ob' Region, Upper Tobol, in westernmost parts, apparently sporadically and often only in vegetative condition. *General distribution*: All of Europe (excluding Arctic zone, Iceland, Ireland, Scotland, Sardinia and Sicily); Balkans-Asia Minor, Armenia-Kurdistan (?), becoming very rare to south and southeast (comparatively uncommon plant in Mediterranean zone). In the Mediterranean part of northwestern Africa, it is replaced by the related species *H. pseudopilosella* Ten. and *H. subuliferum* N.P. In North America, it is introduced. Described from Uppsala. Type in London.

There is no actual type specimen of *H. pilosella* L. Under this name Linnaeus apparently considered many "races" and maybe even

694 all *Acaulia*. Naegeli and Peter (op. cit., p. 142) suggested considering specimens distributed by Fries (*Herb. norm. fasc.* VI, No. 4, p. p. and *Hier. exs.* No. 1, p. p.), collected at Uppsala, as the type specimens.

Economic Importance: Cattle do not eat this plant. Since it propagates well through stolons and, in close communities, apparently, also by seeds (capitulum contains to 130 seeds), and also withstands drought and trampling by cattle, it is a harmful weed capable of gradually degrading meadows and pastures.

This species, in more or less close communities (for example, on alvars where it is a permanent component), has more or less rudimentary stolons according to the studies of G. Vilberg ("*Erneuerung der Loodvegetation durch Keimlinge in OstHarrien, Estland, 1929*").

Note 1. Two species of parasitic fungi, viz. *Puccinia hieracii* (Schum.) Mart. and *Erisiphe hieraciorum* DC. are found on the leaves of *H. pilosella*.

Note 2. The southeastern boundary of the uninterrupted distribution of *H. pilosella* L. passes roughly along the Krasnoufimsk-Stavropol-Khvalynsk (on the Volga) line, Kuznetsk and Serdobsk districts of the Saratov Region, Bobrov and Pavlov districts of the Voronezh Region, and northwestern part of the Kharkov and Dnepropetrovsk regions. Apparently, it is entirely absent altogether or distributed sporadically in Bashkiria and in the southeastern part of the Rostov Region. Collections from these regions would have been of the greatest interest.

Note 3. *H. pilosella* L. (coll.) belongs to the most polymorphic cycle. As a recent species, exhibiting the full development of the cycle, it is extremely variable in almost all its characters. As a result, the efforts of systematists (beginning with Naegeli and Peter) to bring about clarity in the systematics of this cycle are quite understandable. Based on these attempts, to date more than 600 [segregate] taxa of *H. pilosella* have been described, of which about 120 are from the Soviet Union. We are refraining from describing these [segregate] taxa of *H. pilosella* s. l. and are confining ourselves to characterizing only the cycle (collective species) based on the following considerations.

Of the hitherto proposed methods of studying the systematics of *H. pilosella*, the one proposed by Brenner ("*Südfinska Pilosellae*" in *Acta Soc. Fa. Fl. Fenn.* 25, 1903, 2), supplemented by Norrlin (Mela-Cajander, *Suom. Kasvio*, 1906, 625) and also accepted by Zahn, deserves attention. In this method the basis of classification is the ratio of hairs and glands on the involucre bracts.

On this basis, Zahn proposes the following infracyclic subdivision (Zahn in Asch. and Graebn. *Synopsis*, XII, I, 1930, 25).



- I. Involucral bracts very densely or moderately pubescent...
*Tricholepida*
 a. Involucral bracts more or less eglandular, often white-tomentose, very densely pubescent.....*Anadenia*
 697 b. Involucral bracts sparsely glandular, densely pubescent.....
*Oligadenia*
 c. Involucral bracts moderately or to rather densely glandular and accordingly densely or moderately pubescent.... *Pleiadenia*
 II. Involucral bracts very densely or to rather densely glandular, glabrous or with sparse hairs.....*Adenolepida*
 a. Involucral bracts densely glandular and to sparsely pubescent.....*Oligotricha*
 b. Involucral bracts densely glandular only.....*Atricha*
 1. Glands thick, often long and very dense.....*Macradenia*
 2. Glands short or up to very short.....*Micradenia*

We did special work on the systematics of the *H. pilosella* L. collective and had at our disposal the abundant material collected in the Estonian SSR, Latvian SSR, and Leningrad Region, and extensive material of the exsiccatæ collected by Dahlstedt, Johanson, Samuelsson, Norrlin and Lindeberg, which was also identified by them (and partly by Zahn). It was found that often many specimens bearing the same name belonged even to different groups, whereas specimens with different names were found to be identical.

Some interesting facts deserving attention came to light from the work on *H. pilosella* ([from] Estonian SSR). For example, it was found that forms of the xerophytic group *Oligadenia* begin flowering, on the average, a week earlier than forms of the mesophytic group *Atricha*. Further, it was found that not all groups are represented uniformly; for example, species belonging to *Anadenia* were entirely absent, while the remaining groups were distributed such that *Oligadenia* accounted for roughly one-seventh of the specimens studied; *Oligotricha*—about one-fifth; *Pleiadenia* and *Atricha*—each roughly one-third.

Cycle 2. *Velutina* Juxip.—*H. pilosella* L. grex *H. incanum* Zahn in Pflzr. IV, 280 (1923) 1182; Asch and Graebn. Synopsis, XII, I, 54.—*H. pilosella* var. *incanum* Lam. and DC. Fl. fr. IV (1805) 23, V, 437; Froel. in DC. Prodr. VII, 199.—*H. pilosella* var. *velutinum* Hegetschw. ex Froel. l. c.; Fr. Symb. 3; Epicr. 12.—*H. pilosella* b. *farinaceum* Hornem. ex Koch, Synopsis, 2, II (1844) 506; Rchb. Ic XIX, 52, t. 107, f. 2.—*Pilosella velutina* Sz. Sz. in Flora, XXI (1862) 422—*H. pilosella* grex. *Camerarii* N.P. Hier. Mitteleur. I (1885) 143 and grex *Velutinum* N. P. op. cit. p. 169.—*H. velutinum* Arv.-Touv. Catalog, (1913) 7.—Leaves

covered on both sides with stellate down; moderately so above, tomentose beneath.

784. *H. poliphyton* Zahn in Pflzr. IV, 280 (1923) 1182 (nota. sine descript.!) emend. Juxip.

Perennial. Stem scapose, 6–13 cm high; in habit entirely similar to *H. pilosella* but with its short and densely leafy stolons also resembles *H. sabulosorum* Dahlst. but leaves both on stolons and in well developed basal rosette velutinous-stellate-pubescent not only beneath but also above. Involucres 8 mm long; involucral bracts moderately pubescent, sparsely glandular, densely stellate-pubescent. Corollas Yellow; peripheral ones with red stripes on outside. Flowering July.

European Part: Dvina-Pechora. Endemic. Described from Syktyvkar. Type in Leningrad.

Note. In our country, apparently this plant is very rare (the find by V. Andreev in 1908 is to-date the only one); however, the possibility is not ruled out that it is being overlooked, since in habit it does not differ from *H. pilosella*.

Here we should also include *H. peleterianopsis* var. *β. velutinoides* Zahn (Pflzr. IV, 280, 1923, 1165), described from Vologda (not from Syktyvkar?). This question needs further work.

785. *H. kemulariae* Juxip nom. nov.—*H. paradoxum* Kem.-Nat., in Dokl. Akad. Nauk ArmSSR, XVI, No. 2 (1953) 51, non al. auct.

Stem 15–40 cm high, to 2.5 mm in diameter, ascending, densely branched almost from base, to scatteredly pubescent in lower part with white hairs 4–5 mm long, becoming shorter (2 mm long) and decreasing in number upward, eglandular, densely stellate-pubescent, stolons numerous, well developed, above-ground, robust, with remote leaves, gradually becoming smaller toward tip, or stolons rooting, bearing, in effect, a cluster of leaves at tip; leaves lanceolate, acute, as a whole to scatteredly setose and on both sides stellate-pubescent. Basal leaves numerous, oblong, spatulate to lanceolate and acute, to 7 cm long, broad (3–4:1), with scattered, stiff bristles, 5 mm long above, scattered beneath, along midrib moderately setose with bristles 2.5–3.0 mm long, along margin sparsely so, as a whole to scatteredly pubescent, moderately stellate-pubescent above, white-tomentose beneath; cauline leaves absent. Inflorescence deeply dichotomous, with 8 capitula, branches single-headed; peduncles with occasional to sparse white hairs, 1.0–2.5 mm long and scattered, glands 0.4–0.5 mm long, white-tomentose. Involucres 9 mm long, ovate-subglobose; involucral bracts narrow, acute, with light-colored border, with scattered, 36(30–45),

light-colored hairs, 1.5 mm long with black base and with scattered, 27(20–40), glands 0.3–0.4 mm long crowded toward base, to densely stellate-pubescent (margin glabrous). Florets light yellow; peripheral ones usually with red stripes on outside; stigmas yellow, turning brown. Flowering June to July.

Dry rocky slopes, in upper mountain zone.—*Caucasus*: Southern Transcaucasia. Endemic? Described from Aparan District of Armenian SSR. Type in Yerevan.

Economic Importance. The author of the species recommends this species as very suitable in ornamental floriculture as a border plant.

nominum specierum atque synonymorum plantarum
in tomo XXX Florae URSS commemoratarum

711	<i>Acrifolia</i> Juxip, cycl.	96	<i>Bichloricoloria</i> Juxip, cycl.	114
	<i>Acrothyrsa</i> Juxip, cycl.	524	<i>Bifida</i> Juxip, subsect.	356
	<i>Acuminatifolia</i> Juxip, cycl.	259	<i>Bifurca</i> Juxip, cycl.	428
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	<i>Aestiva</i> Juxip. subsect.	125	<i>Bupleurifolia</i> Juxip, cycl.	141
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	<i>Alpina</i> Fr., sect.	147	<i>Callimorphoidea</i> Juxip, cycl.	630
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	<i>Andryaloidea Orientalia</i> Fr.	199	<i>Caucasica</i> Juxip, subsect.	402
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	<i>Apiculata</i> Juxip, cycl.	161	<i>Chaunanthia</i> Juxip, cycl.	661
	<i>Archieracium</i> Fr.	10	<i>Cilicica</i> Juxip, cycl.	684
	<i>Argillaceoidea</i> Juxip, cycl.	267	<i>Cinninata</i> Juxip, cycl.	26
	<i>Arvicola</i> Juxip, cycl.	517	<i>Chlorochroma</i> Juxip, cycl.	25
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	<i>Auriculina</i> N. P., sect.	667	<i>Contracta</i> Juxip, cycl.	554
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			<i>Crocea</i> Juxip, cycl.	654
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	<i>Bauhinia</i> , cycl.	453	<i>Curvescentia</i> Juxip, cycl.	561
	<i>Bauhinia</i> Juxip, subsect.	445	<i>Curvicolla</i> Juxip, cycl.	591

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